

Exhibit 7

**UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY**

**IN RE JOHNSON & JOHNSON
TALCUM POWDER PRODUCTS
MARKETING, SALES PRACTICES, AND
PRODUCTS LIABILITY LITIGATION**

MDL NO. 16-2738 (MAS) (RLS)

THIS DOCUMENT RELATES TO ALL CASES

**REBUTTAL EXPERT REPORT OF
ELIZABETH A. STUART, PH.D.**

Date: July 21, 2024

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A. Stuart** Digitally signed by
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Elizabeth A. Stuart, Ph.D.

I submit this report documenting my expert opinion on O'Brien, K., et al. *Intimate Care Products and Incidence of Hormone-Related Cancers*, 2024. J Clin. Oncol 001-16 (O'Brien 2024). I was asked to review the O'Brien et al. (2024) manuscript and the criticisms of that work offered by Johnson & Johnson's biostatistical expert John Kornak, PhD through his report and his deposition, and in particular the aspects related to genital talc use and ovarian cancer. I have considered the O'Brien et al. (2024) paper, including its methods, results, strengths, and limitations as well as other relevant scientific literature; this report summarizes the results of that consideration.

Summary of Opinion

Overall, I find Dr. Kornak's concerns about O'Brien et al. (2024) substantially incorrect and not reflective of statistical best practices and standards; in particular I do not agree with his characterization of O'Brien et al. (2024) as "flawed and unreliable." In contrast to Dr. Kornak I find the O'Brien et al. (2024) paper to be a careful and thorough analysis, using appropriate and well recognized methods (such as quantitative bias analysis and multiple imputation) to deal with known limitations of the data and explore the implications of potential unknown biases. In particular, O'Brien et al.'s use of quantitative bias analysis and multiple imputation are appropriate and well considered, allowing the analysis to use all the prospective and retrospective data available and drawing appropriate conclusions regarding the links between genital talc use and ovarian cancer. As indicated and expected given its publication in a top peer-reviewed oncology journal it is an important contribution to the body of literature on the relationship between genital talc use and ovarian cancer and should be included when considering the weight of the evidence regarding such a link.

My own qualifications and background

General professional qualifications

I am the Catharine Dorrier and Frank Hurley Professor and Chair in the Department of Biostatistics at the Johns Hopkins Bloomberg School of Public Health – a department consistently ranked as one of the top two biostatistics departments in the country. I also hold a position as Bloomberg Professor of American Health and have joint appointments in the Department of Mental Health, Department of Health Policy and Management, and the School of Education at Johns Hopkins.

I received my PhD in Statistics from Harvard University in 2004; my primary advisor was Donald Rubin, one of the originators of the idea and theory behind multiple imputation. It was during graduate school in 1999-2004 that I first learned about multiple imputation and related missing data methods, from Donald Rubin and other faculty, including Xiao-Li Meng, who first coined the term "congeniality" in this context (discussed further below). As detailed further below since then I have continued to stay abreast of the literature regarding missing data and multiple imputation and have published numerous papers and given multiple presentations and workshops on the topic. I have advised over 15 masters and 15 PhD students and multiple postdoctoral fellows; a number of whom have used multiple imputation and related ideas in their theses, dissertations, and other work, and I have consulted on numerous applied projects that use multiple imputation in practice.

Overall, I have published over 350 papers and have received millions in dollars of research funding as Principal Investigator from the National Science Foundation, the Institute of Education Sciences, the WT Grant Foundation, the Patient Centered Outcomes Research Institute, the

National Institutes of Health, and other entities. I have also served on advisory panels for the National Academy of Sciences, the US Department of Education, and the Patient Centered Outcomes Research Institute.

I am a Fellow of the American Statistical Association (ASA) and the American Association for the Advancement of Science (AAAS) and received the mid-career award from the Health Policy Statistics Section of the ASA, the Gertrude Cox Award for applied statistics, Harvard University's Myrto Lefkopoulou Award for excellence in Biostatistics, and the Society for Epidemiologic Research Marshall Joffe Epidemiologic Methods award. I was formerly Chair of the Patient Centered Outcomes Research Institute's Clinical Trials Advisory Panel and former President of the Society for Research on Educational Effectiveness. I currently serve on the National Academy of Sciences Engineering and Medicine (NASEM)'s Committee on National Statistics and co-chair NASEM's Committee on Applied and Theoretical Statistics.

I also serve as a Statistical Editor for *JAMA Health Forum*, and have served as Associate or Statistical Editor for a number of top statistical and applied journals, including the *Journal of the Royal Statistical Society – Series A*, *Statistics in Medicine*, the *Journal of Research on Educational Effectiveness (methods editor)*, *Observational Studies*, the *Journal of Causal Inference*, *Journal of the American Statistical Association*, *JAMA Psychiatry*, *NEJM Evidence*, and the *Harvard Data Science Review*. My full CV is attached as **Exhibit A**.

Overview of research interests and expertise

My research interests are in statistical methods, especially study design and analysis approaches for estimating causal effects in experimental and non-experimental studies, including questions around the external validity of randomized trials and the internal validity of non-experimental studies, as well as generally how to deal with data complications such as clustering and missing data. My recent work includes methods for combining data sources to assess treatment effect heterogeneity and methods for evidence synthesis, including how to handle disparate or mismeasured outcomes, as well as methods for policy evaluation. My work has broad application across medicine and public health, and I have worked in a number of applied areas, including mental health, substance use, gun violence, suicide prevention, and cancer.

Experience with the missing data and recall bias methods in O'Brien et al. (2024)

As noted above, I first learned about missing data methods and multiple imputation from Donald Rubin from 1999-2004. I have conducted methodological work around best practices for multiple imputation, and the use of multiple imputation to solve data complications and have used multiple imputation in many substantive collaborations and projects.

Since 2008 I have been continuously funded by the National Institutes of Health, including an R01 grant (R01MH099010) that included multiple imputation as one of the approaches used to handle a methodological challenge. I have also served on a panel for the What Works Clearinghouse (an evidence clearinghouse for education research, funded by the US Department of Education) on missing data.

I have taught introductory and more advanced workshops and short courses on missing data, including multiple imputation, both at Johns Hopkins and at conferences. Examples include:

- “Methods for handling missing data in psychosocial research.” Johns Hopkins Bloomberg School of Public Health Summer Institute. (Taught with Dr. Trang Nguyen). Currently on hold given my move to the Department Chair role.
- “Recent advances in missing data methods: Imputation and Weighting”. U.S. Department of Health and Human Services, Maternal and Child Health Bureau, Epidemiology Training Program Webinar, September 2012 (20 attendees).
- “Introduction to methods for handling missing data”. BSPH Center for American Indian Health, January 2012 (15 attendees).
- “Missing Data Methods in Criminology”, Department of Criminology, University of Maryland, April 2009, December 2011.
- “Multiple imputation using chained equations”. International Conference on Health Policy Statistics workshop, October 2011 (50 attendees).
- “Recent advances in missing data methods: Multiple Imputation by Chained Equations.” AcademyHealth Annual Research Meeting methods seminar, June 2010 (80 attendees).
- “Handling missing data: The motivation and method of multiple imputation.” 21st Annual Research Conference: A System of Care for Children’s Mental Health: Expanding the Research Base. Tampa, FL, 2008.
- “Practical issues in implementing multiple imputation.” Association for Public Policy Analysis and Management Annual Research Meeting, Washington, DC, 2007.

I have published multiple studies on multiple imputation and other missing data approaches, including:

- Nguyen, T. Q., & Stuart, E. A. (2024). Multiple imputation for propensity score analysis with covariates missing at random: some clarity on within and across methods. *American Journal of Epidemiology*, kwae105. <https://doi.org/10.1093/aje/kwae105>
- Li, P., and Stuart, E.A. (2019). Best (but oft-forgotten) practices: Missing data methods in randomized controlled nutrition trials. *The American Journal of Clinical Nutrition*. 109:3: 504–508, <https://doi.org/10.1093/ajcn/nqy271>
- Webb-Vargas, Y., Rudolph, K.E., Lenis, D., Murakami, P., and Stuart, E.A (2017). An imputation-based solution to using mismeasured covariates in propensity score analysis. *Statistical methods in medical research*, 26(4), 1824-1837. <http://www.ncbi.nlm.nih.gov/pubmed/26037527>
- Li, P., Stuart, E.A, and Allison, D.B. (2015). Multiple imputation: A flexible tool for handling missing data. *Journal of the American Medical Association* 314(18): 1966-1967. NIHMS ID: 731701. PMCID: PMC4638176. <http://www.ncbi.nlm.nih.gov/pubmed/26547468>.
- Azur, M., Stuart, E.A., Frangakis, C.M., and Leaf, P.J. (2011). Multiple imputation by chained equations: What is it and how does it work? *International Journal of Methods in Psychiatric Research* 20(1): 40-49. PMCID: PMC3074241. <http://www.ncbi.nlm.nih.gov/pubmed/21499542>.
- Stuart, E.A., Azur, M., Frangakis, C.E., & Leaf, P. (2009). Multiple imputation with large datasets: A case study of the Children’s Mental Health Initiative. *American Journal of Epidemiology* 169(9): 1133-1139. PMCID: PMC2727238. <http://www.ncbi.nlm.nih.gov/pubmed/19318618>.

I was also involved in the creation of a statistical software program (a package in the R programming language) that allows the use of multiple imputation with a particular approach for causal inference, propensity scores:

- Pishgar, F., Greifer, N., Leyrat, C., and Stuart, E.A. (2020). MatchThem: matching and weighting after multiple imputation. arXiv preprint arXiv:2009.11772. <https://journal.r-project.org/archive/2021/RJ-2021-073/RJ-2021-073.pdf>. (Not peer reviewed)
- MatchThem package: <https://cran.r-project.org/web/packages/MatchThem/index.html>

In writing this report I consulted the following sources:

- Dr. John Kornak's written Expert Report, dated May 28, 2024, submitted in the United States District Court District of New Jersey (case number 3:16-md-02738, MDL No. 2738)
- The transcript of Dr. John Kornak's deposition, taken July 8, 2024 (MDL No. 16-2738)
- O'Brien et al. (2024) and other scientific literature related to missing data and multiple imputation, as cited below, as well as Rubin (1987) and Little and Rubin (2002).
- I have also used my own statistical and public health knowledge from my over 20 years in the field, and with more context for that provided below.
- I have never before submitted an expert report for any legal cases.

My rate for reviewing the relevant literature was \$900 per hour. My compensation is not contingent in any way or based on the content of my opinion or the outcome of this matter. All opinions expressed and implied in this report are solely mine and do not represent or reflect the views of the Johns Hopkins University or the Johns Hopkins Health System. I have not previously provided expert testimony in the past four years.

A copy of materials relied on and considered are attached as **Exhibit B**.

I now turn to the specifics of the O'Brien et al. paper and Dr. Kornak's comments on it.

Summary of O'Brien et al. (2024)

I now provide a summary of the O'Brien et al. (2024) paper, especially the aspects relevant to the analysis examining any links between genital talc use and ovarian cancer. This report focuses on the O'Brien et al. (2024) paper, but it is important to note that it builds on a broader body of literature and evidence, including, for example, Gonzalez et al. (2016), which used similar data as O'Brien et al. (2024), but did not include any information from the follow-up survey described further below.

O'Brien et al. (2024) uses a combination of prospective and retrospective data from the Sister Study, a cohort study that enrolled over 50,000 women with a sister with breast cancer. Limited information on genital talc use was collected at enrollment between 2003-2009 and more detailed questions regarding talc use were included in a follow-up survey between 2017 and 2019. The paper used Cox proportional hazards models to assess the relationship between genital talc use and ovarian cancer (as well as additional analyses examining douching, and other gynecologic cancers).

A key aspect of the O'Brien et al. (2024) analysis is that it needed to deal with a combination of prospective and retrospective data on genital talc use, as well as missing data on that exposure of interest. In particular, the original Sister Study enrollment survey asked about genital talc use only during specific and limited time windows: ages 10-13 and in the 12 months before enrollment, which Table 1 indicates was on average at about age 53-56. A more detailed follow-up survey between 2017-2019 asked about whether participants ever used douching or genital talc, and if yes, their age at first use and most recent use, and frequency of use during each decade. Of relevance, O'Brien et al. (2023) Table 2 indicates that among genital talc users the most common decades of use were teens, 20's, and 30's, implying that the enrollment survey of the Sister Study would have missed many individuals who used genital talc use in time windows not captured by the enrollment questionnaire – i.e., use of only exposure data from the enrollment questionnaire would underestimate the extent of talc use in the sample. In addition, both surveys had some missing values that need to be addressed in analyses.

As recognized by O'Brien et al. (2024), there are concerns about retrospective assessment of genital talc use, however, especially whether it might be differential across women with and without cancer, which could bias reported associations. O'Brien et al. use a number of approaches to address such a concern, including a well-considered approach to reconciling apparently contradictory enrollment and follow up information, and handling missing exposure values at the follow-up survey among women who hadn't previously reported genital talc use, including a quantitative bias analysis framework and multiple imputation to rigorously assess the implications of such data challenges.

O'Brien et al. (2024) used four primary approaches to handling challenges in the exposure measurement: (1) no exposure data correction, (2) corrections to resolve contradictory enrollment and follow-up information, (3) corrections of contradictory information as well as categorizing missing or undefined as exposed, and (4) the preferred and most rigorous approach, incorporating correction of contradictory information and multiple imputation of missing exposure data. In my opinion, Approach (4) is the most rigorous and preferred approach as it uses a missing at random assumption (detailed more below) to deal with the missing values and takes into account the broader range of time points covered in the follow-up survey. Approaches (2) and (3) each provide an extreme scenario in terms of the missing values, and so in a sense represent a range of possible relationships between talc use and outcomes, with the recognition that each estimate is extreme. The corrections for contradictory information done (as detailed in O'Brien et al.'s Appendix 1) are well thought out and reasoned, such as assuming that women who reported some use were likely users even if they were not fully consistent regarding when that use happened, and that recent use is likely more accurately remembered than use farther in the past.

In addition to those 4 approaches for handling exposure missingness, O'Brien et al. (2024) go even further, and conduct an analysis (Figure 2) to examine how much differential recall bias regarding genital talc use may bias the observed associations between genital talc use and ovarian cancer. In particular, they consider a range of percentages of ovarian cancer cases to be incorrectly classified – users classified as non-users, and vice versa, essentially probing whether the results are sensitive to some unobserved biases. They use a formal framework and well-grounded scientific approach (quantitative bias analysis) to probe the robustness of their primary results to such exposure misclassification.

Overall, I find the set of O'Brien et al. (2024) analyses to be a comprehensive set of appropriate analyses that use the prospective and retrospective data as well as possible, and with an impressive array of robustness checks to probe how sensitive results are to a variety of data challenges and potential biases.

To summarize their results and as accurately noted in the O'Brien et al. (2024) abstract, "In models adjusted for exposure misclassification, genital talc use was positively associated with ovarian cancer (HR range, 1.17-3.34) ...Differential reporting of talc use by cases and noncases likely produces positive biases but correcting for error still resulted in HRs above 1.0. For example, HR, 1.40 (95% CI, 1.04 to 1.89) when 25% of exposed cases and 10% of unexposed noncases had talc status reassigned.... Although results show how differential recall would upwardly bias estimates, corrected results support a positive association between use of intimate care products, including genital talc, and ovarian cancer." This is an accurate summary of the range of results in the paper, with the bulk of analyses – including those that address potential observed and unobserved biases – indicating a link between genital talc use and ovarian cancer.

Background context on the quantitative bias analysis and multiple imputation approaches used in O'Brien et al. (2024)

There are multiple fundamental misunderstandings in Dr. Kornak's report and deposition regarding the implementation of multiple imputation and quantitative bias analysis in O'Brien et al. (2024). In particular, the concerns he raises are unfounded and in reality, O'Brien et al. (2024) follows statistical best practice.

Imputing the exposure variable is a well-established practice

First, Dr. Kornak states that it is fundamentally inappropriate to impute the key exposure variable of interest, as done in O'Brien et al. (2024). Dr. Kornak's interpretation is not consistent with the statistical theory underlying multiple imputation, nor with the guidelines regarding its best use. In fact, the original multiple imputation theory and methods do not distinguish covariates, exposures, and outcomes in terms of the recommended approaches. As just one example, as noted in D'Agostino McGowan et al. (2024), "We focus on the common scenario where a covariate included in the final outcome model has missingness. This covariate can be the variable of primary interest (e.g. a treatment) or one that will be used for adjustment (e.g. age or a comorbidity)." The exposure of interest is commonly imputed, as with other missing variables, and is directly described in the White and Royston (2009) paper referenced by O'Brien et al. (2024). (I note that Dr. Kornak did not reference this White and Royston (2009) paper in his original report and did not seem fully familiar with it in his deposition). To say this a bit more formally and to go back to the original statistical theory underlying multiple imputation (in books such as Rubin (1987) and Little and Rubin (2002)), the theory and methods for missing data typically refer to " Y_{obs} " (the observed values) and " Y_{mis} ," (the missing values) as whole sets of variables, without distinguishing what variables in Y – exposures, outcomes, and/or covariates are bundled all together in " Y ". In other words, what matters is what values are missing, not which types of variables they are in any given analysis.

Including outcomes in the imputation of other variables is statistical best practice

Second, Dr. Kornak states that including the outcomes (cancer incidence) in the imputation model (as done in O'Brien et al. (2024)) is inappropriate and leads to biased results, asserting that it would rely on circular logic. On the contrary, decades of research show that not including the outcome in the imputation approach would lead to bias and that it should in fact be included; this is also recommended in the White and Royston paper cited by O'Brien et al. (2024) when describing their multiple imputation approach. Crucially, *not* including the outcome in imputations of the exposure would assume no relationship between those variables, thus biasing the analysis results towards the null. In other words, if cancer status was not included as a predictor in the imputation models, then the imputations would be generated assuming that there was no relationship between talc exposure and cancer incidence, thus biasing any estimated relationship towards no association. In contrast, including cancer incidence in the imputation approach allows the imputations to be generated in a way that reflects the associations actually observed in the data. Thus, O'Brien et al.'s use of the outcomes in their imputation (as specified in Note d of Table 2 of O'Brien et al. (2024) and other places) is seen as best practice in the missing data literature.

In addition to the White and Royston (2009) paper cited by O'Brien et al. (2024) I highlight just a few relevant quotes from leading researchers in this area describing why outcomes should be included in imputations of other variables:

From D'Agostino McGowan et al. (2024; Statistical Methods in Medical Research; The "Why" behind including "Y" in your imputation model):

"The recommendation to include the outcome in a stochastic imputation model has been given.^{1,4,6,8} However, we have not seen a simple mathematical explanation for why this is so. Additionally, the inclusion of the outcome in the imputation model is often perceived as a suggestion rather than a stipulation, but, as we demonstrate here, this ought not just be recommended but rather required in order to yield unbiased results with stochastic imputation." (p. 1006).

From Moons et al. (2006; Journal of Clinical Epidemiology, Using the outcome for imputation of missing predictor values was preferred):

"For all types of missing values, imputation of missing predictor values using the outcome is preferred over imputation without outcome and is no self-fulfilling prophecy."

From Kontopantelis et al. (2017; Outcome-sensitive multiple imputation: a simulation study, BMC Medical Research Methodology; Discussion):

"However, as long as the outcome is included in the imputation model, the choice of the multiple imputation approach makes no practical difference. Important covariates need to be included in the imputation models even when their levels of missingness are very high. Although the use of secondary outcomes did not lead to substantially better models in our simulations, some improvements were observed in the sensitivity analysis, and we recommend their inclusion. Multiple imputation is the best

approach across all missingness mechanisms and offers some protection in some simple missing not at random contexts.”

From Bartlett, Frost, and Carpenter (2011; Brain; Multiple imputation models should incorporate the outcome in the model of interest):

“In summary, we emphasize that multiple imputation is a powerful statistical tool for the analysis of partially observed data that can alleviate biases and recover information. However, the validity of estimates and inferences relies critically on appropriate specification of the imputation model. In general, one should always include the outcome variable of the final model of interest in the imputation model, and failure to do so may result in biased estimates of associations between the variable being imputed and the outcome of interest.”

From White, Royston, and Wood (2010; Statistics in Medicine; Multiple imputation using chained equations: Issues and guidance for practice):

“To avoid bias in the analysis model, the imputation model must include all variables that are in the analysis model [7]. In particular, when imputing missing values of analysis model covariates, the analysis model outcome must be in the imputation model [25].”

The quotes above are just a sampling of the methodological papers that discuss this issue.

Stepping back for just a bit more context, the issue itself is one example of a foundational concept in multiple imputation, which is that of “congeniality.” Dr. Kornak did not reference this literature in his report, and it is unclear if it was taken into account in his assessment of O’Brien et al. (2024). First articulated and proven by Meng (1994; *Statistical Science*; Multiple-imputation inferences with uncongenial sources of input); congeniality refers to whether an imputation model is in a sense “larger” than the analysis models that will later be run using the imputed data, and Meng (1994) and others show that for accurate results following multiple imputation the models do need to be congenial. In other words, the imputation model should be “larger” than the analysis model in the sense that all variables to be used in the analysis should be included in the imputation procedure, and not doing so will lead to bias in the results (in particular, bias towards a null finding in this case, underestimating the true association between talc exposure and cancer incidence). This is well known in the imputation literature, and guidance in my own and others’ peer-reviewed papers is that the imputation models should include all variables to be used in the analysis, as illustrated in the quotes above.

Of relevance and indicating the alignment of their methods with best practice in the multiple imputation literature, O’Brien et al. (2024) also include some “auxiliary” variables in the imputation model (page 4) – variables that are not included in the analysis model but may be predictive of the missing values, including childhood household income level, marital status, and weight relative to peers in teen years. Auxiliary variables such as these are used to help improve imputation of missing genital talc exposure variables.

Unfounded concerns about multiple imputation if data is not missing at random

Third, Dr. Kornak implies that multiple imputation itself is fully inappropriate because of concerns about missingness being not missing at random – that, as acknowledged by O’Brien et al. (2024), and as O’Brien et al. probe to some extent with their Scenarios 1-3 and recall bias sensitivity analyses, there may be unobserved factors that relate to missingness of the exposure (talc use) and outcomes of interest.

This too is a misunderstanding. It is common practice to use multiple imputation to handle and adjust for observed variables as well as possible, assuming missing at random, and then to essentially “add on” a robustness check / sensitivity analysis assessing how much the results would change if there was some unobserved factor that might relate to missingness, exposure, and/or outcome, as a way to probe missingness that may be “not at random” – exactly the process that O’Brien et al. (2024) use. This sort of approach, which first imputes assuming missing at random, and then considers violation of missing at random through a sensitivity analysis type approach as implemented by O’Brien et al. (2024) is recommended in Rubin (1987), Enders (2010), Carpenter and Kenward (2013, e.g., p. 72, Section 10.2) and others. As summarized by Schafer (“Analysis of incomplete multivariate data”, p. 26), “Even when the missing data are not precisely MAR, however, general ignorable procedures [such as multiple imputation assuming missing at random] still tend to be better than ad hoc procedures such as case deletion,” explaining basically that dealing with the observed variables through an approach like missing at random helps address any bias due to those observed factors, thus mitigating any bias, while approaches such as complete case analysis do not.

Multiple imputation is not a speculative approach that “makes up” data

Fourth, throughout his report and deposition Dr. Kornak implies that multiple imputation is “making up” data and that it is speculative and suggests that the strongest analysis would be one using only the “true” observed data -- what is known as a “complete case” analysis that uses data only from women with no missing values. However, as is well established in the statistical literature, complete case and related approaches are illusory in terms of their seeming validity. In particular, complete case analysis can lead to bias because often the people with fully observed data are not representative of the underlying population and requires an assumption of “missing completely at random” – that the people with missing values are no different on average than people with fully observed values. Using multiple imputation instead allows a weaker assumption -- missing at random – which allows the missingness to depend on observed characteristics. As shown in Table 1 of O’Brien et al. (2024) (and as mentioned in Paragraph 47 of Dr. Kornak’s report) there are differences in the covariates between women with observed and missing values on genital talc use (including variables such as race/ethnicity, Census region, and history of hormonal birth control use, among others). An analysis such as Dr. Kornak suggests, which would drop anyone with missing genital talc data, would not account for those differences in characteristics. The multiple imputation-based approach (e.g., O’Brien et al. (2024)’s “Scenario 4” in Table 2) does.

To summarize, as stated in Li, Stuart, and Allison (2015; JAMA), “Many nonstatisticians chafe at ‘making up data’ as is done in MI [multiple imputation] and note that the validity of MI depends on an assumption about which factors relate to the probability that a data point is missing. Because of concern this assumption may be violated, it is tempting to retreat to the safe haven of complete

case analysis, i.e., only analyze the participants without missing values. This safe haven is, however, illusory. Although rarely made explicit by users, complete case analysis requires a far more restrictive assumption than whether any data-point is missing at random.”

Multiple imputation is not about guessing, but rather about using methods that will give accurate inferences about the parameters of interest. With missing data, we have to make some assumptions about the missingness, and the key is to make those assumptions as reasonable as possible, such as through the missing at random assumption used by O’Brien et al. (2024) in their Scenario 4.

A related note is that O’Brien et al. (2024) does show variation in results using the different missing data approaches to deal with missing exposures (Scenarios 1-4 in Table 2). As discussed above, Scenarios 1-3 each represent a fairly extreme assumption – Scenarios 1 and 2 assume that everyone who reported no exposure at enrollment and had missing values at follow up was unexposed, while Scenario 3 assumes that all of those individuals were exposed. O’Brien et al. (2024) acknowledge that they are extreme situations, but they provide some sense of the implications of those extremes on the relationships under study. Scenario 4 uses multiple imputation to make a more realistic assumption – missing at random – and uses the observed data (on covariates and outcomes) to multiply impute missing exposure status at follow-up. Doing such an approach, probing different scenarios, is an example of a thorough analysis approach. (And then O’Brien et al. (2024) follow up with an additional analysis, probing the missing at random assumption and assessing how much results would change if there were unobserved differences between the women with and without missing follow-up information (the recall bias Scenarios in Figure 2).

Given the varying assumptions underlying the Scenarios in Table 2 it is not surprising that some of the results change after imputation, and/but, importantly, O’Brien et al. would not have known in which direction the results might change before running the analyses.

Multiple imputation can yield accurate results even without strong predictors of missing values

Finally, and fifth, in his report, Dr. Kornak implies that the [multiply] imputed talc use may not be accurate, given the lack of strong predictors of talc use. This would be a problem if O’Brien et al. did single imputation, as the analysis then would not account for the uncertainty in the imputed values. However, O’Brien et al. (2024) used multiple imputation, and with multiple imputation if there are not strong predictors of the missing values (talc use in this case) the imputations will just be very variable, and the variance estimation will account for that uncertainty. This again is one of the key benefits of multiple (vs. single) imputation.

Other concerns raised by Dr. Kornak

Using only prospective data is likely not the most rigorous analysis

Dr. Kornak implies in his deposition that the majority of the O’Brien et al. (2024) analyses are speculative and involve making up data and results and implies that the most rigorous analysis is the first set of Columns of Table A2, which uses only the prospective data collection on exposure status from the original survey. There are three problems with that perspective.

First, those analyses are severely underpowered, and so while the point estimates for links between douching and genital talc use are above 1 (1.30 and 1.02, respectively), the confidence intervals are quite broad.

Second, that initial survey does not take into account possible exposure across the life span, as captured more fully by the fourth follow-up questionnaire. As discussed above, that later questionnaire captured possible talc use from many more calendar years, rather than just ages 10-13 and the 12 months before the initial questionnaire (the information available in the enrollment questionnaire). Some women who did not report talc use in the initial survey but did in the retrospective follow-up questions may have used talc in the time periods not covered by the initial survey, and O'Brien et al. (2023) indicates that actually a substantial number of women may have used talc in the decades not covered well by the enrollment survey. Dr. Kornak implies that any difference in reports from the enrollment survey to the follow-up survey implies bias/incorrect answers, but it may be that both responses are accurate and due to differences in the time periods reported on, with the follow-up survey including a more comprehensive set of time points.

Third, Dr. Kornak seems to ignore the final columns of Table A2, which includes all of the prospective data available. Thus, if preference is for use of only prospective data (as implied by Dr. Kornak), that final column is what should be preferred, given its use of prospective data and exposure information from both enrollment and follow-up. Those results show a hazard ratio of 1.84 (95% CI: 0.90, 3.77). Although not statistically significant this analysis has limited statistical power and does indicate a potential link between genital talc exposure and ovarian cancer. That said, O'Brien et al. (2024)'s decision to include those analyses in an appendix rather than in the main text is also reasonable, given that it is not as comprehensive and does not use as much of the data as does the careful and appropriate analyses in the main text, in Tables 2-4 and Figure 2.

Dangers of overreliance on “statistical significance”

This raises another key point regarding interpretation of study results. Although a p-value less than 0.05 has been regarded in a variety of scientific contexts as indication of a meaningful relationship, an overreliance on a strict threshold does not indicate best scientific practice.

Statistical significance is an arbitrary threshold and a result crossing the arbitrary 0.05 p-value threshold does not magically mean that it is more accurate or “real” than an estimate whose p-value does not meet that threshold; for example, in fact two results may be broadly consistent with one another even if one has a p-value less than 0.05 and the other does not, due to differences in statistical power or other statistical factors. The challenges and inaccurate interpretations that can be generated through inappropriate reliance on an arbitrary p-value threshold such as $p < .05$ are highlighted in the 2016 American Statistical Association statement on p-values. As summarized by Principle 3 of that statement, “Practices that reduce data analysis or scientific inference to mechanical “bright-line” rules (such as “ $p < 0.05$ ”) for justifying scientific claims or conclusions can lead to erroneous beliefs and poor decision making. A conclusion does not immediately become “true” on one side of the divide and “false” on the other. Researchers should bring many contextual factors into play to derive scientific inferences, including the design of a study, the quality of the measurements, the external evidence for the phenomenon under study, and the validity of assumptions that underlie the data analysis. Pragmatic considerations often require binary, “yes-no” decisions, but this does not mean that p-values alone can ensure that a decision

is correct or incorrect. The widespread use of “statistical significance” (generally interpreted as “ $p \leq 0.05$ ”) as a license for making a claim of a scientific finding (or implied truth) leads to considerable distortion of the scientific process.”

Overstatement regarding potential recall bias

Dr. Kornak also implies that there is likely large recall bias. However, O’Brien et al. (2023) shows relatively strong reliability of self-reported measures of douching and genital talc use, with approximately 90% reporting consistent results, and that that rate did not differ by cancer status. Dr. Kornak is also concerned about possible differential response based on cancer status, implying that women who developed cancer and had used genital talc may have had more incentive to respond. However, it is important to remember that the follow-up survey was not specifically about talc use, and was a quite long survey, and so it is unclear how often respondents would have been responding because of their desire to report specifically on their talc use (or not). It could be interesting to explore missing data patterns in other variables in the follow-up survey and assess whether they follow similar patterns as the talc use questions. In addition, it is important to note that O’Brien et al. (2024) do not rely on an assumption that there is no differential recall bias; probing robustness of results to a variety of recall bias scenarios is why they do the analyses in Figure 2. The fact that O’Brien et al. do multiple imputation and then also do some robustness checks to some recall bias is not a sign that they are aiming to manipulate the results to show an effect, but rather that they are thoughtful and careful scientists who want to probe possible biases, even if deemed unlikely.

Inaccurate characterization of analyses as merely “thought experiments”

Throughout his report and deposition Dr. Kornak discounts many of the O’Brien et al. (2024) analyses as a “thought experiment.” On the contrary, the quantitative bias analysis approach underlying the results in Figure 2 of O’Brien et al. (2024) is a well-established scientific approach, used to probe the robustness of results to a range of underlying data scenarios. Essentially, the multiple imputation helps deal with observed characteristics that predict missing talc use and talc use itself, and then the recall bias exercise basically asks how much it would change the results if there is additional recall bias, and especially if there is recall bias that differs between women with and without cancer. Ironically, this sort of analysis is very similar in spirit to the “tipping point” analysis Dr. Kornak suggests that O’Brien et al. should do in Paragraph 51 of his report – taking a sensitivity parameter (in O’Brien et al.’s case, the extent of recall bias among cases and non-cases) and probing how much various values of it would change the study conclusions. In that sense O’Brien et al. are actually taking Dr. Kornak’s suggestion and implementing it to help understand the strength of the evidence regarding links between douching and genital talc exposure and cancer outcomes.

Rigorous science can be done using surveys and questions not originally planned

Another concern raised by Dr. Kornak is about the validity at all of the follow-up survey and implies that because the questions about previous talc use in the follow-up survey were not part of the original survey design at enrollment that any analyses using them are invalid. This attitude does not reflect the reality of scientific practice. It is incredibly common for longitudinal cohorts to add questionnaires later as science evolves; this might include additional retrospective elements such as done in the Sister Study. For example, the ECHO study, which I am involved in, involves combining data across a number of cohorts related to child health, with new questionnaires being

used – assessing things that would not have been anticipated when those cohorts began. The idea that scientists can only study topics planned when a cohort was started (sometimes 20+ years earlier) does not represent good scientific practice and would mean that many scientific advances would not have happened, for example not being able to study anything about COVID-19 in cohorts that began before the COVID-19 pandemic, or nothing about HIV in cohorts that began before the emergence of HIV.

**The value of the peer-review and scientific process,
and importance of consideration of the weight of evidence**

I want to close with some notes about the peer review process and the need for scientific expertise in judging research studies such as O'Brien et al. (2024). Scientific research is complex, and with advanced statistical methods and research designs that require substantial expertise to evaluate. Although I have not published in the *Journal of Clinical Oncology*, I understand that it is a top journal in the field (ranked in the top 10 by multiple journal rating scales, including #1 based on google scholar's h-index (a commonly used metric), and #6 of 322 in terms of impact factor), and I'm sure with robust and rigorous peer-review procedures. It is important to recognize that process, and the input that would have been received and incorporated by the authors in that process, provided by other experts in the field, who would have assessed the data and methods used, as well as whether the conclusions drawn by the authors are reasonable and appropriate.

It is also important to note that with complex scientific questions such as the links between environmental or other exposures and outcomes such as cancer it is incredibly useful to have multiple studies to help understand the underlying mechanisms and causal links – Paul Rosenbaum at the University of Pennsylvania refers to this as a “causal crossword” (*Observational Studies*, 2015). This was also a theme in two National Academies reports I co-authored (NASEM, 2020, Long-term effects of antimalarial drugs), including one on a causality framework for air pollution and human health that I was the co-chair for (NASEM, 2022, Advancing the Framework for Assessing Causality of Health and Welfare Effects to Inform National Ambient Air Quality Standard Reviews).

To summarize, those reports, and scientific best practice, involves a thoughtful and thorough consideration of all the evidence available, combined with a weight of evidence approach that assesses the strengths and limitations of each study, without arbitrary lines regarding which studies should or should not be included at all. Thoughtful scientists recognize, for example, that randomized trials generally offer the most internally valid estimates of causal relationships between exposures and outcomes, and that they are often infeasible for some important scientific questions, and thus that well-done non-experimental studies can provide important insights, and with their strengths and limitations taken into account. Analogously here, it would be inappropriate to assert that only prospective information can be used to assess the links between genital talc use and ovarian cancer, or that only studies that meet an arbitrary p-value less than 0.05 threshold should be considered at all. Any assessment of links between genital talc use and cancer outcomes should take into account the overall scientific record on the topic, assessing the weight of the evidence and recognizing that each study will have strengths and limitations. The methods of O'Brien et al. (2024) are strong and have passed a rigorous peer review process; it is the sort of study that should be included in an assessment of the weight of the evidence, with the rest of the relevant literature.

Exhibit A

Updated June 25, 2024

CURRICULUM VITAE

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PROFESSIONAL DATA

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EDUCATION AND TRAINING

2004 PhD Statistics, Harvard University
 Advisor: Professor Donald B. Rubin
 Thesis "Matching methods for estimating causal effects using multiple control groups"

2001 AM Statistics, Harvard University

1997 AB Mathematics (major) and Chemistry (minor), Smith College

1995-1996 Visiting Student in Mathematics and Computation, Oxford University

PROFESSIONAL EXPERIENCE

2023 - Frank Hurley and Catharine Dorrier Professor and Chair
 Department of Biostatistics
 Department of Mental Health (joint)
 Department of Health Policy and Management (joint)
 Johns Hopkins Bloomberg School of Public Health
 Johns Hopkins University School of Education (courtesy joint)

2020-2024- Bloomberg Professor of American Health
 Faculty Member, JHU Data Science and AI Institute

2022-2023 Executive Vice Dean for Academic Affairs

2021 Vice Dean for Education

2017- Core Faculty, Bloomberg American Health Initiative

2016-2021 Associate Dean for Education

2015- Professor

2010-2022 Co-Director, BSPH Center for Mental Health and Addiction Policy

2010-2020 Associate Director for Statistical Methods, BSPH Wendy Klag Center for Autism & Developmental Disabilities

2011-2015 Associate Professor
 Johns Hopkins Bloomberg School of Public Health

2006-2011 Assistant Professor
 Johns Hopkins Bloomberg School of Public Health

2004-2006 Researcher
 Mathematica Policy Research, Inc.

2006 Adjunct Faculty
 Joint Program in Survey Methodology, University of Maryland

and University of Michigan

- 2004. Contractor
U.S. Bureau of the Census
- 1999-2004 Research Assistant for Professor Gary King
Department of Government, Harvard University
- 1999-2004 Teaching and Research Assistant
Department of Statistics, Harvard University
- 1999. Research Assistant/Programmer
Mathematica Policy Research, Inc.
- 1997. Research Assistant
Department of Mathematics, Smith College

PROFESSIONAL ACTIVITIES

Society Membership and Leadership

- Eastern North American Region, International Biometric Society
- Award Committee Member, Elizabeth L. Scott award, 2023 -
- American Association for the Advancement of Science (AAAS) Section U Electorate Nominating Committee, 2020-2022
- Association for Schools and Programs of Public Health
- Education Advisory Committee, 2019-
- Data Section Institutional Representative, 2019 - 2021
- Task Force on Scholarship of Teaching and Learning, 2018 - 2021
- American Statistical Association, 2001-present
- Selection Committee, Editor, *Journal of Statistics and Public Policy*, 2023-2024
- Excellence in Statistical Reporting Award Committee, 2021-2023
- Founding Member, Mental Health Statistics Section
- Co-Director, Charter Workgroup, 2011
- Member, Liaison Committee, 2012 - 2016
- Council of Sections Representative, 2012 – 2015
- Chair Elect, 2016
- Chair, 2017
- Past Chair, 2018
- Social Statistics Section
- Program Chair, 2012
- Health Policy Statistics Section
- Awards Committee, 2017
- Waksberg Award selection committee, 2016-2018
- Council of Sections Nominating Committee, 2013
- Committee on Women in Statistics, 2007 - 2012
- ASA Gertrude Cox Scholarship Committee, 2006-2008
- Member, Focus Group on AAAS Human Rights Coalition and International Right to Enjoy the Benefits of Scientific Progress and its Applications, 2011
- Judge, Washington Statistical Society Curtis Jacobs Award, 2005
- American Educational Research Association
- Palmer O. Johnson Award Committee, 2019-2021
- International Conference on Health Policy Statistics

Chair, Outreach Committee, 2017
Organizing Committee, 2011, 2013, 2015, 2017
Third Annual Thomas R. Ten Have Symposium on Statistics in Mental Health
Organizing Committee, 2013
Society for Epidemiologic Research
Member, Education Committee, 2018-2020
Society for Prevention Research
Member, Innovative Methods Theme Committee, 2009-2011
Annual Meeting Program Committee, 2009
Society for Research on Educational Effectiveness, 2011 – present
President, 2022
Board member, 2017 - 2023
Association for Public Policy Analysis and Management, 2004-2008
Methods Program Committee, Fall Research Meeting, 2012, 2013
International Biometric Society Eastern North American Region
Spring Meeting Program Committee, 2010
American PsychoPathological Association, 2009-2010
Organizer, Atlantic Causal Inference Conference, 2008, 2012
American Public Health Association, 2007-2009
Institute of Mathematical Statistics, 2001-2008

Participation on Advisory Panels and Boards

2024 - Panel Member, Panel on 8th Edition of Principles and Practices for a Federal
Statistical Agency, National Academies of Sciences, Engineering, and
Medicine
2023- Member, AWS Impact Computing Project Advisory Board, Harvard Data Science
Initiative
2023- co-Chair, Committee on Applied and Theoretical Statistics (CATS), National
Academies of Sciences, Engineering, and Medicine
2022- Advisory Board, Blueprints for Healthy Youth Development
2022- Core Member, TARGET - TrAnsparent ReportinG of studies Emulating a Target
trial work group
2022- Member, Informed Population Health Opinions (INPHO) survey, Stanford
University
2021-2023 Committee on the Implications of Using Multiple Data Sources for Major Survey
Programs, National Academies of Sciences Engineering and Medicine
2021- External Advisory Board, Center for Perioperative Mental Health (NIMH-funded
ALACRITY Center), Washington University
2021-2022 co-Chair, National Academies of Sciences Engineering and Medicine Panel on
Assessing Causality from a Multidisciplinary Evidence Base for National
Ambient Air Quality Standards
2020- Committee on National Statistics (CNSTAT), National Academies of Sciences,
Engineering, and Medicine
2020- Committee on Applied and Theoretical Statistics (CATS), National Academies of
Sciences, Engineering, and Medicine
2019 Homeless Veterans Reintegration Program Evaluation Technical Working Group
U.S. Department of Labor/Mathematica
2019 Panel to assess the long-term impacts of antimalarials, National Academies of
Sciences, Engineering, and Medicine
2019 National Cancer Institute (NCI) Provocative Questions Workshop Member
2018 Friends of Cancer Research Historical Control Task Force

2018 Pew Charitable Trusts, Coordinating Center for the Community Opioid Response & Evaluation Project (CORE), National Advisory Committee.

2018 Promise Neighborhoods Evaluation Technical Working Group, US Department of Education/Mathematica Policy Research

2017 - 2018 Applied Research Advisory Group
GovEx

2016 - What Works Clearinghouse panel on missing data
US Department of Education, Institute of Education Sciences

2016 - Member, Improvement Analytics Unit Technical Advisory Group
The Health Foundation and NHS England

2016 Committee of Visitors, Division of Social and Economic Sciences
National Science Foundation

2014-2018 Chair, Inaugural PCORI Clinical Trials Advisory Panel

2014 National Academy of Sciences Planning Meeting on the Design and Analysis of Observational Studies to Enhance Their Use in Providing Causal Inference (for the National Institute of Aging)

2014 Member, What Works Clearinghouse Findings Development Team
U.S. Department of Education/Mathematica Policy Research, Inc.

2014-2015 Panel on Research Methodologies and Statistical Approaches to Understanding Driver Fatigue Factors in Motor Carrier, Safety and Driver Health (Committee Code: ZZ134455), National Academy of Sciences

2012 GEAR Up Evaluation Technical Working Group
U.S. Department of Education/Abt Associates

2012 Advisory Committee on Advancing Adult Education Research
U.S. Department of Education, Institute of Education Sciences

2012 Committee to advise The Legacy Foundation Schroeder Institute for Tobacco Research and Policy Studies on issue of equipoise

2011-2015 Evaluation of Race To The Top and School Improvement Grants Technical Working Group
U.S. Department of Education/Mathematica Policy Research, Inc.

2010-2013 Evaluation of Teacher Residency Programs Technical Working Group
U.S. Department of Education/Mathematica Policy Research, Inc.

2010 National Evaluation of the Individuals with Disabilities Education Act (IDEA) Technical Assistance and Dissemination Program (TA&D Program) Technical Working Group
U.S. Department of Education/Westat

2009-2012 ITEST Advisory Board
U.S. Department of Education/University of South Florida

2008 Strengthening Adult Reading Instructional Practices Advisory Board
U.S. Department of Education/Abt Associates

2007 National Head Start Impact Study Advisory Board
U.S. Department of Health and Human Services

Consultations

2018-2020 University of Rochester, Crisis Text Line evaluation (Dr. Anthony Pisani)

2016-2017 National Cancer Institute

2014-2017 Georgetown University (Center for Research on Children in the United States)

2014-2016 Arizona State University (Prevention Research Center; Dr. Irwin Sandler)

2013-2015 Brigham and Women's Hospital (Department of Pharmacoepidemiology)

2013 SRI International

2012-2013 National Opinion Research Center (NORC)

2010-2013 Abt Associates
 2009-2011 Washington University
 2008-2010 American Institutes for Research
 2008 The Urban Institute
 2006-2012 University of Pennsylvania School of Medicine
 2006 Mathematica Policy Research, Inc.
 2004-2006 RAND Corporation
 2002-2005 Genzyme Corporation
 2000-2004 Active Girls Initiative

Faculty Affiliations

Faculty Member, JHU Data Science and AI Institute (2024-)
 Research Affiliate, the Stanford Education Opportunity Project (2023-)
 Advisory Board, The Good Science Project-JHU MA in Science Writing Fellowship (2023-)
 Hopkins Business of Health Initiative (Core Faculty, 2022 -)
 Johns Hopkins Center for Gun Violence Solutions (Core Faculty, 2021 -)
 Bloomberg American Health Initiative (Evidence workgroup lead, 2016-)
 Hopkins Population Center (Faculty Associate and Coordinating Committee, 2015-)
 BSPH Center for Mental Health and Addiction Policy (co-Director, 2014-2022; Senior Advisor 2023-)
 Lerner Center for Public Health Promotion (Special Advisor, 2018 - 2020)
 Mannheim Center for European Social Research, University of Mannheim (External Fellow, 2014)
 BSPH Wendy Klag Center for Autism & Developmental Disabilities (Associate Director; 2013-)
 BSPH Center for Prevention and Early Intervention (Methods Core Co-Director, 2006 - 2014)
 JHU Institute for Data Intensive Engineering and Science (IDIES; Affiliate Member, 2013 -)
 BSPH Center for Drug Safety and Effectiveness (Core Faculty; 2012 -)
 BSPH Center for the Prevention of Youth Violence (2006 - 2019)
 BSPH Psychiatric Epidemiology Training Program (Core Faculty; 2012 -)
 BSPH Drug Dependence Epidemiology Training Program (Core Faculty; 2012 - 2017)
 Summer Research Institute on Geriatric Mental Health Affiliated Faculty (2013)
 Johns Hopkins University Training Program in Education Research (2009-2012)
 BSPH ACTIVE Evaluation, Fidelity Assessment Advisory Board (2010-2012)
 Faculty Visitor, BEAR Program, Graduate School of Education, University of California at Berkeley (2008)
 Faculty Visitor, Institute for Employment Research, Nuremberg, Germany (2011)
 Steering Committee, Prevention Science & Methodology Group (PSMG; 2012 - 2016)

Data Safety Monitoring Boards (DSMB)

National Institute of Drug Abuse HEAL Prevention DSMB (2020-)
 Drexel University, Connecting the Dots Study (Promoting Positive Outcomes for Individuals with ASD: Linking Early Detection, Treatment, and Long-term Outcomes) (PI: Robins, 2018)
 Columbia University Center for Homelessness Prevention Studies (PI: Caton; 2011)
 The Impact of Neighborhoods, Networks and Depression on Drug Users' HIV Risks (PI: Latkin; 2009-2011)

EDITORIAL AND OTHER PEER REVIEW ACTIVITIES

Editorial Boards

2009 - 2012 Associate Editor, *Journal of the Royal Statistical Society, Series A*
 2011 – 2016 Associate Editor, *The Journal of Causal Inference*
 2012 - 2020 Associate Editor, *Sociological Methods and Research*

2012 - 2016 Associate Editor, *Statistics in Medicine*
2013 - 2014 Associate Editor, *Journal of Educational and Behavioral Statistics*
2014 - 2019 Management Committee, *Journal of Educational and Behavioral Statistics*
2013 - 2015 Associate Editor, *Journal of Research on Educational Effectiveness*
2014 - 2016 Associate Editor, *Journal of the American Statistical Association, Reviews*
2014 - Associate Editor, *Observational Studies*
2015 - 2019 Associate Editor, *Psychometrika*
2015 - 2019 Methods Editor, *Journal of Research on Educational Effectiveness*
2018 - 2021 Associate Editor, *Journal of the American Statistical Association Theory & Methods*
2018 - 2023 Statistical Reviewer, *JAMA Psychiatry*
2018 - 2021 Associate Editor, *American Journal of Political Science*
2021 - 2023 Statistical Reviewer, *NEJM Evidence*
2022 - Associate Editor, *Harvard Data Science Review*
2023 - Statistical Editor, *JAMA Health Forum*

Journal Peer Review Activities

Academy Health
Administration and Policy in Mental Health
American Journal of Epidemiology (Outstanding reviewer award, 2018)
American Journal of Evaluation
American Journal of Geriatric Psychiatry
American Journal of Public Health
The American Statistician
Annals of Applied Statistics
Annals of Epidemiology
Annals of Internal Medicine (Outstanding reviewer award, 2023)
Bayesian Analysis
Biometrics
Biostatistics
British Medical Journal (BMJ)
Children and Youth Services Review
Circulation
Clinical Trials
Communications in Statistics
Comparative Effectiveness Research
Computational Statistics and Data Analysis
Criminology
Developmental Psychology
Educational Psychology Review
Epidemiology
Epidemiology and Psychiatric Sciences
European Journal of Agricultural Economics
Health Economics
Health Services & Outcomes Research Methodology
Health Services Research
International Journal of Biostatistics
International Journal of Eating Disorders
International Statistical Review
Journal of Adolescent Health
Journal of the American Medical Association

Journal of the American Statistical Association
Journal of Behavioral Health Services & Research
Journal of Clinical Epidemiology
Journal of Clinical Psychiatry
Journal of Consulting and Clinical Psychology
Journal of Educational and Behavioral Statistics (Outstanding reviewer award, 2011)
Journal of Health Communication
Journal of Official Statistics
Journal of Politics
Methodology
Multivariate Behavioral Research
PeerJ
Pharmacoepidemiology and drug safety (Outstanding reviewer award, 2012)
Prevention Science
Psychiatric Services
Psychological Methods
Psychology of Addictive Behavior
Review of General Psychology
Science
Sociological Methods & Research
Statistical Methods in Medical Research
Statistica Sinica
Statistical Science
Statistics in Medicine
Survey Methodology

Proposal Reviews

2017 – 2020 Chair, National Institute of Mental Health Services Research Committee
(**SERV**)
2015-2017 Standing Member, National Institute of Mental Health Services Research
Committee (**SERV**)
2014 National Institute of Mental Health, Clinical Trials to Test the Effectiveness of
Treatment, Prevention, and Services Interventions R01 and R01 Collaborative
(Clinical Trials R01) Applications (**ZMH1 ERB-K (01)**)
2014 National Institute of Mental Health, Services Conflicts (**ZMH1 ERB-K (06)**)
2014 National Institute of Mental Health, Improving Health and Reducing Premature
Mortality in People with Severe Mental Illness (**ZMH1 ERB-1 03 R**)
2014-2016 Principal member, Institute of Education Sciences, U.S. Department of
Education, Education Systems and Broad Reform Review Panel
2013 National Institute of Mental Health, Fellowships and Dissertations Review Panel
(**ZMH1 ERB-K 01 L**; ad hoc)
2013 Institute of Education Sciences, U.S. Department of Education, Accelerating the
Academic Achievement of Students with Learning Disabilities Research Initiative
Review Panel (ad hoc)
2012 National Institute of Mental Health, Grand Challenges in Global Mental Health,
Special Emphasis Panel (**ZMH1 ERB-B**)
2011-2013 Principal member, Institute of Education Sciences, U.S. Department of
Education Statistics and Modeling Panel
2011-2012 Institute of Education Sciences, U.S. Department of Education, Math and
Science I Review Panel (ad hoc)
2010 National Institute of Mental Health, Interventions Committee For Disorders

Involving Children And Their Families (**ITVC**; ad hoc)
2010 Institute of Education Sciences, U.S. Department of Education, Early Intervention
and Early Childhood Education Panel (ad hoc)
2010 Institute of Education Sciences, U.S. Department of Education, Education Systems
and Broad Reform Panel (ad hoc)
2009 Institute of Education Sciences, U.S. Department of Education, Reading,
Writing, and Language Development Panel (ad hoc)

Book reviewer

Oxford University Press
Sage Publications
Springer Verlag

Ad-hoc review of grant proposals

National Science Foundation
Netherlands Organisation for Health Research and Development

HONORS AND AWARDS

Honors

2020	Fellow, American Association for the Advancement of Science (AAAS)
2016	Delta Omega Honor Society in Public Health, Alpha Chapter
2014	Fellow, American Statistical Association
2009	Paper recognized as "New Hot Paper" by Thomson Reuters
2008	Warren Miller Prize for best paper published in Volume 15 of <i>Political Analysis</i> .
1997	AB Magna cum laude, Smith College
1997	Phi Beta Kappa

Awards

2021-2022	Highly Cited Researcher (top 1% of citations), Clarivate
2020	Marshall Joffe Methods Award, Society for Epidemiologic Research
2019	Highly Cited Researcher (top 1% by citations), Web of Science
2017	American Statistical Association, Gertrude Cox Award, Washington Statistical Society/RTI
2015	American Statistical Association Health Policy Statistics Section Mid- Career Award
2015	BSPH AMTRA Advising, Mentoring, and Teaching Recognition Award
2010	BSPH Golden Apple award for Excellence in Teaching
2010	BSPH AMTRA Advising, Mentoring, and Teaching Recognition Award
2010-2024	BSPH Recognition for Excellence in Teaching (based on course reviews; for 2 courses: 140.664, 330.805, nearly every time the courses offered)
2007	Johns Hopkins Bloomberg School of Public Health Edward R. Brewster Faculty Innovation Fund Awardee
2007	Child Prevention, Intervention, and Services Fellow
2007	Society for Prevention Research Travel Award
2002	Harvard University Cochran Travel Award
2001	Student Paper Award ASA Government Statistics/Social Statistics Section/Survey Research Methods Section of the American Statistical Association
2000	American Statistical Association Gertrude Cox Scholarship

2002, 2004	Harvard University Certificate of Distinction in Teaching
1999	Harvard University William Cochran Fellowship
1999-2001	National Science Foundation Graduate Research Fellowship
1997	Smith College Pokora Prize for Senior who excels in Mathematics
1995-1997	Barry M. Goldwater Scholar
1993-1997	Robert C. Byrd Scholar

Named Lectureships

2024	Science Achievement Graduate Fellowship Lecture, The Pennsylvania State University
2021	Keynote, Harvard Data Science Initiative 5-year Anniversary, Harvard University
2021	Distinguished Speaker Series, Research Center for Child Well-Being, University of South Carolina
2021	Myra Samuels Memorial Lecture, Perdue University Department of Statistics
2020	Rod Little Lectureship Award, University of Michigan Department of Biostatistics
2018	Myrto Lefkopoulou Distinguished Lectureship, Harvard University Department of Biostatistics
2017	The Dorothy Wrinch Lecture in Biomathematics, Women in Mathematics in New England Conference, Smith College
2013	Dean's Lecture, Curry School of Education, University of Virginia
2012	Dean's Distinguished Lecture, Harvard University Graduate School of Education

PUBLICATIONS

[* indicates order of authors alphabetical]

[** indicates student co-author]

Journal Articles (peer review)

1. Gemmill A, Margerison CE, **Stuart E.A.**, Bell SO. (2024) Infant Deaths After Texas' 2021 Ban on Abortion in Early Pregnancy. *JAMA Pediatr*. Published online June 24, 2024. <https://jamanetwork.com/journals/jamapediatrics/article-abstract/2819785>.
2. Ettman, C.K., Badillo-Goicoechea, E., and **Stuart, E.A.** (in press). Financial strain, schooling modality, and mental health of U.S. adults living with children during the COVID-19 pandemic. Forthcoming in *Journal of Epidemiology & Community Health*.
3. Nguyen, T. Q., **Stuart, E. A.**, Scharfstein, D. O., & Ogburn, E. L. (2023). Sensitivity analysis for principal ignorability violation in estimating complier and noncomplier average causal effects. Forthcoming in *Statistics in Medicine*. <https://doi.org/10.1002/sim.10153>.
4. Nguyen, T. Q., & **Stuart, E. A.** (2024). Multiple imputation for propensity score analysis with covariates missing at random: some clarity on within and across methods. *American Journal of Epidemiology*, kwae105. <https://doi.org/10.1093/aje/kwae105>.

5. **Ringlein, G.V., Ettman, C.K., and **Stuart, E.A.** (in press). Links between income or job loss and psychological distress during the COVID-19 pandemic. *JAMA Network Open*.
6. **Stone, E.M., **Jopson, A.D., Seewald, N.J., **Stuart, E.A.**, Wise, E., McCourt, A.D., German, D., and McGinty, E.E. (in press). Effects of Texas state agency integration on mental health service use among individuals with co-occurring cognitive disabilities and mental health conditions. *Community Mental Health Journal*.
7. **Flores, J.P., Kahn, G., Penfold, R.B., **Stuart, E.A.**, Ahmedani, B.K., Beck, A., Boggs, J.M., Coleman, K.J., Daida, Y.G., Lynch, F.L., Richards, J.E., Rossom, R.C., Simon, G.E., and Wilcox, H.C. (2024). Adolescents who do not endorse risk via the patient health questionnaire before self-harm or suicide. *JAMA Psychiatry*.
<https://doi.org/10.1001/jamapsychiatry.2024.0603>
8. Letourneau, E. J., Walker, A., Sun, Y., Nair, R., Assini-Meytin, L. C., **Stuart, E. A.**, & McGinty, E. B. (2024). Associations between the Affordable Care Act's Medicaid expansion and youth violent offense charges and adjudications from 2008-2018. *Psychology, Public Policy, and Law*.
9. Schuler, M.S., Coffman, D.L., **Stuart, E.A.**, Nguyen, T.Q., Vegetabile, B., McCaffrey, D.F. (2024). Practical challenges in mediation analysis: A guide for applied researchers. *Health Services and Outcomes Research Methodology*. Published online 12 April 2024.
<https://doi.org/10.1007/s10742-024-00327-4>
10. Nguyen, T. Q., Carlson, M. C., & **Stuart, E. A.** (2024). Identification of complier and noncomplier average causal effects in the presence of latent missing-at-random (LMAR) outcomes: a unifying view and choices of assumptions. *Biostatistics*, kxae011.
<https://doi.org/10.1093/biostatistics/kxae011>
11. Ettman, C.K., Badillo Goicoechea, E., **Stuart, E.A.**, and Dean, L.T. (in press). Area-level credit scores and symptoms of depression and anxiety in adults. *American Journal of Epidemiology*.
12. Eddelbuettel, J.C.P., Kennedy-Hendricks, A., Meiselbach, M.K., **Stuart, E.A.**, Huskamp, H.A., Busch, A.B., Hollander, M.A.G., Schilling, C., Barry, C.L. & Eisenberg, M.D. (2024). Changes in Healthcare Spending Attributable to High Deductible Health Plan Offer Among Enrollees with Comorbid Cardiovascular Disease and Substance Use Disorder. *Journal of General Internal Medicine*, 1-8. <https://link.springer.com/article/10.1007/s11606-024-08700-2>
13. McGinty, E.E., Alegria, M., Beidas, R.S., Braithewaite, J., Kola, L., Leslie, D.L., Moise, N., Mueller, B., Pincus, H.A., Shidhaye, R., Simon, K., Singer, S., **Stuart, E.A.**, Eisenberg, M.D. (2024). The Lancet Psychiatry Commission on Transforming Mental Health Implementation Research. *Lancet Psychiatry*, 11(5), 368-396.
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PRACTICE ACTIVITIES

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2. Pandemic learning loss will take years to reverse. Public Health On Call. August 11, 2023. <https://johnshopkinssph.libsyn.com/648-pandemic-learning-loss-will-take-years-to-reverse>
3. Interview with Elizabeth Stuart, Biostatistician and Professor at Johns Hopkins University. The Mixtape with Scott [Cunningham]. May 30, 2023. https://causalinf.substack.com/p/s2e17-interview-with-elizabeth-stuart?utm_source=substack&utm_medium=email#details
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11. Making safe decisions during the race of "infections vs. injections." (with Keri Althoff). Public Health on Call. April 15, 2021. <https://johnshopkinssph.libsyn.com/296-making-safe-decisions-during-the-race-of-infections-vs-injections>
12. Considering holiday travel during COVID-19. (with Keri Althoff). Public Health on Call. December 7, 2020. <https://johnshopkinssph.libsyn.com/215-considering-holiday-travel-during-covid-19>
13. Thinking through the fall and winter holidays during COVID-19: Innovative ways to gather and celebrate. (with Keri Althoff). Public Health on Call. October 15, 2020. Contributed to Public Health on Call receiving a Council for Advancement and Support of Education (CASE) Circle of Excellence Award; over 133,000 downloads. <https://johnshopkinssph.libsyn.com/180-thinking-through-the-fall-and-winter-holidays-during-covid-19-innovative-ways-to-gather-and-celebrate>

14. How families can make decisions around summer activities during COVID-19. (with Keri Althoff). Public Health On Call. June 24, 2020. <https://johnshopkinssph.libsyn.com/101-how-families-can-make-decisions-around-summer-activities-during-covid-19>.
15. How the experts are dealing with COVID-19 in their personal lives. (with Keri Althoff). Public Health On Call. March 31, 2020. <https://johnshopkinssph.libsyn.com/how-the-experts-are-dealing-with-covid-19-in-their-personal-lives>.
16. Evening the (propensity) score. The Podcast @ DC. January 10, 2020. <https://soundcloud.com/user-768286365/evening-the-propensity-score>.
17. Special co-host Liz Stuart. The Effort Report. November 20, 2017. <https://effortreport.libsyn.com/60-special-co-host-liz-stuart>.
18. Ignore the job description (A case study). The Effort Report. July 17, 2017. <https://effortreport.libsyn.com/47-ignore-the-job-description-a-case-study>.

Presentations to policy-makers, communities, and other stakeholders

1. "The Quantum Opportunity Program Demonstration: Final Impacts." Briefing for Deputy Assistant Secretary, U.S. Department of Labor, Washington, DC, 2006.
2. "The Individual Training Accounts Experiment: What Did We Learn?" Briefing for Deputy Assistant Secretary, U.S. Department of Labor, Washington, DC, 2006.
3. "Power analysis for the behavioral sciences". Administration for Children and Families, U.S. Department of Health and Human Services, March 2009.
4. "Introduction to Statistics". State of Delaware Psychiatry Residency Program, March 2009
5. "Recent advances in missing data methods: Imputation and Weighting". U.S. Department of Health and Human Services, Maternal and Child Health Bureau, Epidemiology Training Program Webinar, September 2012 (20 attendees).
6. "The loss of external validity in program evaluations that select sites purposively." Institute of Education Sciences Speaker Series, Washington, DC, 2011.
7. "Analysis methods for enhancing external validity." Invited speaker at two-day meeting on external validity, Office of Planning, Research, and Evaluation, Administration for Children and Families, Department of Health and Human Services, Washington, DC, 2014.
8. "Using propensity scores in difference-in-difference models to estimate causal effects." Invited speaker at Center for Medicare & Medicaid Innovation, Centers for Medicare & Medicaid Services, Baltimore, MD, 2015
9. "Propensity score methods: The why, what and how." One-day short course at Center for Medicare & Medicaid Innovation, Centers for Medicare & Medicaid Services, Baltimore, MD, 2015.
10. "Propensity score methods with complex survey data." Invited lecture at the National Center for Health Statistics, Hyattsville, MD, 2015.
11. "Overview of Panel Report: Research methodologies and statistical approaches to understanding driver fatigue factors in motor carrier safety and driver health." Briefing to the

Federal Motor Carrier Safety Administration, U.S. Department of Transportation, Washington, DC, 2016.

12. "Propensity score methods." Invited lecture in the Division of Cancer Control and Prevention Sciences, National Cancer Institute, Bethesda, MD, July 2016.
13. "Tutorial on propensity score methods." Invited tutorial at the Office of Biometrics, Center for Drug Evaluation and Research (CDER), Food and Drug Administration (FDA), July 2016.
14. "Methods for assessing the generalizability of randomized trials to target populations." One-day short course at Institute of Education Sciences, US Department of Education, December 2017.
15. "Advanced methods for non-experimental studies." One-day short course at National Center for Education Statistics, US Department of Education, January 2018.
16. Moderator, Panel on Exploring whether a synthetic control arm can be derived from historical clinical trials that match baseline characteristics and overall survival outcome of a randomized control arm: Case study in non-small cell lung cancer. Friends of Cancer Research Annual Meeting. November 2018.
17. "Designs for evidence-based policymaking." Presentation to the Lab@DC. Washington, DC, January 2019.
18. "Propensity score methods for non-experimental studies." Short course for Summer at Census. US Census Bureau. Suitland, MD, July 2019.
19. "Propensity scores: The basics and recent advances." Webinar for the Office of Science, Center for Tobacco Products, US Food & Drug Administration. Webinar, November 2022.

Software development

1. Ho, D.E., Imai, K., King, G., and **Stuart, E.A.** (2010). MatchIt. Software and package vignette for nonparametric preprocessing for parametric causal inference; listed at the Comprehensive R Archive Network. <http://cran.r-project.org/web/packages/MatchIt/index.html>.

Other: Data availability

1. *Ho, D.E., Imai, K., King, G., and **Stuart, E.A.** (2006). Replication Data Set for "Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference", hdl:1902.1/YVDZeqIYDS <http://id.theData.org/hdl%3A1902.1%2FYVDZeqIYDS> ; UNF:3:QV0mYCd8eV+mJgWDnYct5g== Murray Research Archive [distributor(DDI)]

Media Appearances or Quotations

ABC News (print)
Australian Broadcasting Company (ABC; TV)
The Associated Press
Bloomberg News (radio and TV)
CBS News (print)
Education Week
Gizmodo

The Guardian
Huffington Post
Kaiser Health News
National Public Radio (radio and print)
The New York Times
The Philadelphia Inquirer
Politico
ProPublica
Reuters
Tech and Learning
USA Today
US News and World Report
The Wall Street Journal
The Washington Post
WebMD
Wired
WTOP news (radio)

CURRICULUM VITAE

Elizabeth A. Stuart

PART II

TEACHING

Academic Advisees

Valerie Harder PhD, Mental Health 2008
Cannabis use and depression: Demystifying propensity score techniques
Current Position: Associate Professor, Public Health Virtual, University of Vermont

Satoko (Janet) Kuramoto-Crawford PhD, Mental Health 2011
Suicidal ideation among inner-city drug users: Association with social support networks
and polydrug use
* Winner of Morton Kramer Award from Department of Mental Health
Current Position: Social Behavioral Scientist Administrator, National Institute of Drug
Abuse, National Institutes of Health

Finbarr Leacy ScM, Biostatistics 2012
On the Joint Use of Propensity and Prognosis Scores in Causal Treatment Effect Estimation
Current Position: Expert Biostatistician, European Medicines Regulatory Network, Health Products Regulatory Authority

Grace Lee PhD, Mental Health 2013
Antecedents, patterns, and consequences of gambling among urban youth
Current Position: Clinical Trials Results Analyst Associate, ICF International

Hali Hambridge ScM, Biostatistics 2013
Handling the Complexities of Missing Data in the Context of a Propensity Score
Analysis.
* Delta Omega Inductee
Current Position: PhD Candidate, Harvard Department of Biostatistics

Megan Schuler PhD, Mental Health 2013
 Estimating the relative treatment effects of natural clusters of adolescent substance
 abuse treatment services: Combining latent class analysis and propensity score
 methods
 Winner of Morton Kramer Award from Department of Mental Health
 Delta Omega Inductee
 Current Position: Policy Researcher, the RAND Corporation

Kara Rudolph MHS, Biostatistics 2014
(Concurrent with PhD in Epidemiology)
Estimating population treatment effects from a survey sub-sample
Current position: Assistant Professor, Department of Epidemiology, Columbia University
K99/R00 recipient from the National Institute of Drug Abuse

Sarah Naeger	PhD, Mental Health	2014
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Associations between Community Violence and Academic Competency in Urban Elementary School Children

Current Position: Director, Real World Investigator, Sanofi

Yenny Webb-Vargas (co-advisor) PhD, Biostatistics 2016
Winner, 2015 Student Paper Award, Government/Social/Survey Statistics Sections of the American Statistical Association

Current Position: Principal Statistical Scientist, Genentech

David Lenis PhD, Biostatistics 2017

Current Position: Vice President, Biostatistics, Aetion

Luther Kalb PhD, Mental Health 2017

Mental health crisis in youth with Autism Spectrum Disorder

Recipient of NRSA F31 award from NICHD (primary mentor)

Winner of Morton Kramer award from the Department of Mental Health

Current Position: Associate Professor, Kennedy Krieger Institute and BSPH

Adam Pittman ScM, Biostatistics 2019

Current position: Chief of Population Health, Maryland Health Services Cost Review Commission

Benjamin Ackerman PhD, Biostatistics 2020

Methods for transportability: Addressing external validity and measurement error concerns in randomized trials

Current Position: Principal Statistician, Janssen

Curtis Leung DrPH, Health Policy and Management 2020

Current position: Manager, ECG Management Consultants

Ting-Hsuan Chang ScM, Biostatistics 2021

Current position: PhD Candidate, Department of Biostatistics, Columbia University

Lucy Qiao MHS, Biostatistics 2021

(Concurrent with PhD in Epidemiology)

Current position: Associate Director, Epidemiology, AstraZeneca - Oncology

Natalya Kostandova MHS, Biostatistics 2023

(Concurrent with PhD in Epidemiology)

Elizabeth Sarker PhD, Biostatistics 2023

Current position: Statistician, Eli Lilly and Company

Ian Schmid PhD, Mental Health 2023

Current position: Applied Statistician, Hailee Dunn Consulting

Carly Lupton Brantner PhD, Biostatistics 2024

(formerly Lupton-Smith)

2023 Jane and Steve Dykacz Award honoring the best student paper in medical Statistics

2023 June B. Culley Award honoring outstanding achievement by a Biostatistics

student on his or her preliminary school-wide examination paper

2024 Delta Omega

Current position: Assistant Professor, Duke University Department of Biostatistics

Jason Haw	MHS, Biostatistics	2024
	(Concurrent with PhD in Epidemiology)	
2023 Louis I. and Thomas D. Dublin Award for work in Epidemiology and Biostatistics		
Mincen Liu	ScM, Biostatistics	2024
Victoria Green (joint advisor)	PhD, Mental Health	
Leon DiStefano (joint advisor)	PhD, Biostatistics	
Grace Ringlein (joint advisor)	PhD, Biostatistics	
Noor Qaragholi	DrPH	
Bloomberg Fellow		

Post-doctoral fellows

Kara Rudolph	2014
Current position: Assistant Professor, Department of Epidemiology, Columbia University	
K99/R00 recipient from the National Institute of Drug Abuse	

Trang Nguyen (co-advisor)	2014-2016
Current position: Associate Research Professor, Department of Mental Health, Johns Hopkins Bloomberg School of Public Health	

Hwanhee Hong	2014-2018
K99/R00 recipient from the National Institute of Mental Health	
Current position: Assistant Professor, Department of Biostatistics and Bioinformatics, Duke University	

Marissa Seamans	2017 – 2019
K01 recipient from the National Institute of Drug Abuse	
Current position: Assistant Professor, Department of Epidemiology, University of California – Los Angeles	

Sachini Bandara	2018 – 2019
Funded through NIMH T32 on Mental Health Services and Systems	
Current position: Assistant Professor, Department of Mental Health, Johns Hopkins Bloomberg School of Public Health	

Stephanie Moore	2018-2020
Funded through NIMH T32 on Mental Health Services and Systems	
Current position: Assistant Professor, University of California – Riverside	

Youjin Lee	2019
Current position: Assistant Professor, Department of Biostatistics, Brown University	

Esita Patel (co-advisor, Brendan Saloner) Current position: OB/gyn nurse	2019-2021
Keisha Solomon (co-advisor, Brendan Saloner) Current position: Research scholar, Howard University	2019-2022
Noah Greifer Current position: Programmer, Harvard University Institute for Quantitative and Social Science	2020-2021
Joseph Kush (co-advisor, Rashelle Musci) Current position: Assistant Professor, James Madison University	2021-2022
Yongqi Zhong (co-advisor, Bryan Lau) Current position: Senior Biostatistician, GRAIL	2021-2022
Jason Gibbons (co-advisor, Brendan Saloner) Current position: Assistant Professor, Department of Health Systems, Management, and Policy; University of Colorado Anschutz Medical Campus	2021 – 2023
Samantha Harris (co-advisor, Brendan Saloner) Current position: Assistant Scientist, Department of Health Policy and Management, Bloomberg School of Public Health	2021- 2023
Nick Seewald (co-advisor, Beth McGinty) Current position: Assistant Professor, Department of Epidemiology and Biostatistics, University of Pennsylvania School of Medicine	2021-2023
Catherine Ettman Current position: Assistant Professor, Department of Health Policy and Management, Bloomberg School of Public Health	2022- 2023
Harsh Parikh (co-advisor, Kara Rudolph)	2023 –
Bijan Niknam	2023 -
<i>MPH Advisees</i>	
Sushant Sahastrabuddhe	2009-2010
Pamela Trangenstein	2012-2014
Noor Qaragholi	2021-2022
<i>MPH Capstone Advisee</i>	
Sushant Sahastrabuddhe	2010
Haley Gibbs	2015
Ahmed Hassan	2016
Siva Mulpuru	2020
Michael Yan	2020
Noor Qaragholi	2022
<i>Master's Thesis Reader</i>	
Keri Calkins, Epidemiology	2014

Lu Shen, Biostatistics	2014
Katherine Freeland, Biostatistics	2015
Jeffery Zhao, Duke University Dept. of Biostatistics	2022
Elizabeth Wagner, Biostatistics	2024

Preliminary Oral Exam Participation (PhD or DrPH)

Alisha Creel	Health, Behavior, and Society	2007
Chanelle Howe	Epidemiology	2007
Lauren Cain	Epidemiology	2007
Erin McDonald	Health, Behavior, and Society	2007
Leslie Thornton	Mental Health	2008
Meredith Weaver	Health, Behavior, and Society	2008
Beth Marshall	Population, Family, and Reproductive Health	2008
Bruce Swihart	Biostatistics	2008
Lok Wong	Health Policy and Management	2008
Haley Hedlin	Biostatistics	2008
Julie Leis	Mental Health	2009
Alden Gross	Mental Health	2009
Isadora Gil	Health Policy and Management	2009
Amy Daniels	Mental Health	2009
Jennifer McCleary-Sills	Health, Behavior, and Society	2009
Bridget Ambrose	Epidemiology	2009
Camelia Graham	Mental Health	2009
Fang Tian	Epidemiology	2010
Mara McAdams	Epidemiology	2010
Benjamin Johns	International Health	2010
Brian Weir	Health, Behavior, and Society	2010
Erin Trish	Health Policy and Management	2010
Gregory Tung	Health Policy and Management	2010
David Hanna	Epidemiology	2010
Dell Simmons	Graduate Training Program in Clinical Investigation	2010
John Ayers	Health, Behavior, and Society	2011
Elizabeth Harrison	Population, Family, and Reproductive Health	2011
Alexo Esperato	Health Policy and Management	2012
Christine Buttorff	Health Policy and Management	2012
Sarah Khasawinah	Mental Health	2012
Laysha Ostrow	Mental Health	2013
Jeffrey Duong	Mental Health	2013
Barbara Condliffe	Sociology	2013
Kari Weber	Epidemiology	2013
Parichoy Pal Choudhury	Biostatistics	2013
Eric Roberts	Health Policy and Management	2013
Siri Warkentian	Sociology	2013
Julia Baller	Health Policy and Management	2013
Claudia Salzberg	Health Policy and Management	2014
Alene Kennedy Hendricks	Health Policy and Management	2014
Samira Soleimanpour	Population, Family, and Reproductive Health	2014

Katharine Shelley	International Health	2015
Luke Kalb	Mental Health	2016
Ryan Andrews	Mental Health	2016
Hillary Samples	Health Policy and Management	2016
Taruja Kamarker	Health Policy and Management	2016
Sachini Bandara	Health Policy and Management	2016
Lyndsey Ferris	Health Policy and Management	2017
Alex McCourt	Health Policy and Management	2017
Alex Secora	Epidemiology	2017
Prosenjit Kundu	Biostatistics	2018
Margaret (Jean) Flores	Health Policy and Management	2018
Bingkai Wang	Biostatistics	2018
Rheanna Platt	Graduate Training Program in Clinical Investigation	2018
Amelie Hecht	Health Policy and Management	2018
Molly Francis	Health Policy and Management	2018
Julia Burgdorf	Health Policy and Management	2018
Kayla Tormohlen	Mental Health	2019
Geoff Kahn	Mental Health	2019
Curtis Leung	Health Policy and Management	2019
Bonnie Smith	Biostatistics	2019
Daniel Antiporta	Epidemiology	2019
Sherri-Chanelle Breighthaupt	Mental Health	2019
Debra Bozzi	Health Policy and Management	2019
Trang Nguyen	Biostatistics	2020
Kayte Andersen	Epidemiology	2020
Brendan Rabideau	Health Policy and Management	2020
Natalya Kostandova	Epidemiology	2021
Courtney Nordeck	Mental Health	2021
Leeya Correll	Population Family and Reproductive Health	2021
Elizabeth Stone	Health Policy and Management	2021
Claire Heffernan	Biostatistics	2021
Tyler Smith	Environmental Health and Engineering	2021
Sanjana Pampati	Emory Univ. Dept. Of Epidemiology	2022
Max Rubinstein	Carnegie Mellon Univ. Dept. of Statistics	2022
Kate Nelson	London School of Hygiene and Tropical Medicine, Statistics and Epidemiology	2022
Angela Liu	Health Policy and Management	2022
Jason Haw	Epidemiology	2022
Rui Chen	DrPH	2022
Christopher (Ross) Hatton	Health Policy and Management	2023
Kristin Bevilacqua	Population Family and Reproductive Health	2023
Jirka Taylor	Health Policy and Management	2024
<i>Final Oral Exam Participation (PhD or DrPH)</i>		
Erin McDonald	Health, Behavior, and Society	2007
Xianbin Li	Biostatistics	2008

Chanelle Howe	Epidemiology	2009
Suzanne Goodwin	Health, Policy and Management	2009
Brian Lee	Epidemiology	2009
Beth Marshall	Population, Family, and Reproductive Health	2009
Leslie Thornton	Mental Health	2009
Nirali Shah	International Health	2010
Anna Christensen	Population, Family, and Reproductive Health	2010
Fengmin Zhao	International Health	2010
Alden Gross	Mental Health	2010
Julie Leis	Mental Health	2010
Amy Daniels	Mental Health	2011
Fang Tian	Epidemiology	2012
Lok Wong Samson	Health Policy and Management	2012
Benjamin Johns	International Health	2012
Nkemdiri Iruka	Health, Behavior, and Society	2012
Isadora Gil	Health Policy and Management	2012
David Hanna	Epidemiology	2012
Rebecca Evans	Health, Behavior, and Society	2012
Ben Zablotsky	Mental Health	2012
Brian Weir	Health, Behavior, and Society	2012
Gregory Tung	Health Policy and Management	2012
Divya Nair	International Health	2012
Elizabeth Harrison	Population, Family, and Reproductive Health	2013
Lauren Pacek	Mental Health	2013
Megan Schuler	Mental Health	2013
Christina Sun	Health, Behavior, and Society	2014
Kara Rudolph	Epidemiology	2014
Alexo Esperato-Martinez	Health Policy and Management	2014
Marian Jarlenski	Health Policy and Management	2014
Laysha Ostrow	Mental Health	2014
Christine Buttorff	Health Policy and Management	2014
Julia Baller	Health Policy and Management	2014
Emily Adrion	Health Policy and Management	2015
Claudia Salzberg	Health Policy and Management	2015
Samira Soleimanpour	Population, Family, and Reproductive Health	2015
Hoon Byun (DrPH)	Health Policy and Management	2016
Yi Lu	Biostatistics	2016
Steve Sutch (DrPH)	Health Policy and Management	2016
Mariana Socal	International Health	2017
Katharine Shelley	International Health	2017
Krycia Cowling	Health Policy and Management	2017
Nicole Fusco	Epidemiology	2017
Kriti Jain	Health Behavior and Society	2018
Sachini Bandara	Health Policy and Management	2018
Elizabeth Humberstone	Education	2018
Margaret (Jean) Flores	Health Policy and Management	2019
Lindsey Ferris	Health Policy and Management	2019

Julia Burgdorf	Health Policy and Management	2020
Amelie Hecht	Health Policy and Management	2020
Kayla Tormohlen	Mental Health	2020
Molly Francis	Health Policy and Management	2020
Imke Mayer	EHESS, Ecole Polytechnique	2021
Debra Bozzi	Health Policy and Management	2021
Geoff Kahn	Mental Health	2021
Trang Nguyen	Biostatistics	2021
Sarah Robertson	Brown University Epidemiology	2021
Rheanna Platt	Graduate Training Program in Clinical Epidemiology	2022
Brendan Rabideau	Health Policy and Management	2022
Ayobami Akenroye	Epidemiology	2022
Max Rubinstein	Carnegie Mellon University	2023
Wanyu Huang	Engineering	2023
Natalya Kostandova	Epidemiology	2023
Elizabeth Stone	Health Policy and Management	2023
Avery Davis	School of Education	2024
Sanjana Pampati	Emory Univ. School of Public Health	2024
Jason Haw	Epidemiology	2024
Christopher (Ross) Hatton	Health Policy and Management	2024

Training Grant Mentorship

Co-Sponsor, PI: Elizabeth Stone (Johns Hopkins Bloomberg School of Public Health)

F31MH131311-01; 9/1/22 – 8/31/24

“The role of state agencies in mental health services for individuals with co-occurring intellectual and developmental disabilities and mental illness”

Co-Mentor, PI: Genevieve Graaf (University of Texas Arlington School of Social Work)

K01MH129991; 5/1/22-4/30/2026

“Assessing the impacts of Medicaid Home and Community Based Waivers for children with Severe Emotional Disturbance”

Co-Mentor, PI: Sunny Bai (Pennsylvania State University)

KL2 award; 5/22-4/24

“Crossover Effects of a Universal Adolescent Substance Use Prevention Program on Suicide Risk in Adulthood: Causal inference methods for studying mechanisms of change”

Co-Mentor, PI: Alina Schnake-Mal (Drexel University)

“Social and policy determinants and impacts on COVID-19 and influenza disparities”

(K01AI168579); 02/10/2022 - 02/01/2027

Co-Sponsor, PI: Kira Riehm (BSPH)

F31 award, National Institute of Mental Health (F31MH124330)

“Diagnostic, treatment, and health-related outcomes of depression screening in primary care settings: a longitudinal cohort study of adolescents”

Co-Mentor, PI: Catherine Lesko (BSPH)

K01 award, National Institute on Alcohol Abuse and Alcoholism (K01AA028193)

“Unhealthy alcohol use, other drug use, and mental health disorders: comorbidity burden in people with HIV, gaps in treatment, and impact on the HIV care continuum”

Co-Mentor, PI: John Jackson (BSPH)

K01 award, National Heart Lung and Blood Institute (NHLBI)

Co-Sponsor, PI: Geoff Kahn (BSPH)

F31 award, National Institute of Mental Health (F31MH120973)

"Predicting Suicide Attempts in Youth with Child Protective Services Contact"

Co-Mentor, PI: Alan Rathbun (University of Maryland)

Pilot Study, Claude D. Pepper Older Americans Independence Center

University of Maryland School of Medicine

"Characterizing the Heterogeneity and Role of Depression in Hip Fracture Recovery"

Advisor, PI: Catherine Maulsby (BSPH)

K01 award, National Institute of Mental Health (K01MH111388)

"An HIV Retention in Care Intervention for Black MSM in Baltimore with a Job Readiness Component"

Mentor, PI: Hwanhee Hong (BSPH/Duke)

K99 award, National Institute of Mental Health (K99MH111807)

"Estimating Population Effects in Mental Health Research Using Meta-Analysis"

Mentor/Research Supervisor, PI: John Jackson (BSPH)

NIH LRP

Classroom Instruction

Johns Hopkins University

<u>Year</u>	<u>Course/Description</u>	<u>Enrollment</u>
2008 -	Estimating causal effects in medicine and public health Dept. of Biostatistics 140.664 (Onsite and online)	50 - 120
2011 -	Seminar in statistical methods for mental health Dept. of Mental Health 330.805	10 - 25
2010 -	Estimating the effects of mental health interventions in non-experimental settings Mental Health Summer Institute	5 - 21
2009 -	Missing data methods for mental health Research Mental Health Summer Institute	4 - 12

Guest Lectures

2016-2017	Public health perspectives on Autism Spectrum Disorders (D. Fallin and L. Li)
2011	Advanced Statistical Methods in Education Research (M. Stein) JHU School of Education ED.883.720 Instructor for 2 sessions on power analysis

2009	Doctoral Seminars in Epidemiology (S. Goodman) Co-instructor for 3 sessions on causal inference BSPH Epidemiology 340.863.01
2008-2011	Seminars on Methods in Public Mental Health Research (P. Leaf) BSPH Mental Health 330.660.01
2006-	Prevention of Mental Disorders: Public Health Interventions (N. Ialongo and G. Rebok) BSPH Mental Health 330.607.01
2007-2010	Methodologic Challenges in Epidemiologic Research (D. Fallin, T. Glass, S. Cole) BSPH Epidemiology 340.754.01

Other institutions

2006	Causal Inference in Randomized Experiments and Observational Studies Joint Program in Survey Methodology, University of Maryland
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Other Teaching

“Statistical Inference for causal effects in experiments and observational studies through potential outcomes.”

Short course (with Donald B. Rubin and Samantha R. Cook)

Offered at the Food and Drug Administration (2003), Harvard University (2004), the Joint Statistical Meetings (2003), Karolinska Institute (Stockholm; 2004), the Medical College of Wisconsin (2003), the Conference of the Society for Multivariate Analysis in the Behavioral Sciences (SMABS, 2004), Smith College (2005), and the University of Minnesota (2003)

“Missing Data Methods in Criminology”

Department of Criminology, University of Maryland, April 2009, December 2011

“Applied Propensity Score Analysis II: Practical Considerations and Lessons for Use”
AcademyHealth webinar, January 2010 (> 100 attendees)

“The how, when, and why of the use of matching methods and propensity scores”

Advanced Quantitative Methods in Education Research, UCLA College of Education,
April 2010 (35 attendees)

Short course at the 2015 International Meeting of the Psychometric Society, Beijing,
China, July 2015

“Recent advances in missing data methods: Multiple Imputation by Chained Equations.”

AcademyHealth Annual Research Meeting methods seminar, June 2010 (80 attendees).

“Multiple imputation using chained equations”.

International Conference on Health Policy Statistics workshop, October 2011 (50
attendees)

“The how, when, and why of the use of matching methods and propensity scores”

American Statistical Association Philadelphia Chapter, Short Course, November 2011
(50 attendees)

Johnson and Johnson, April 2012 (100 attendees)

University of Pennsylvania Graduate School of Education, IES Training Program (25
attendees);

European Educational Research Association, Oslo, Norway, May 2014 (25 attendees).

“Introduction to methods for handling missing data”

BSPH Center for American Indian Health, January 2012 (15 attendees)

“The how, when, and why of the use of matching methods and propensity scores”

JHMI General Internal Medicine Fellows Program, November 2012

“Propensity score methods for estimating causal effects in pharmaceutical research: The why, when and how.”

ASA Biopharmaceutical Section/FDA Workshop, September 2014

American Statistical Association webinar, June 2015 (over 100 attendees)

Food and Drug Administration, July 2017

“Non-experimental study methods for psychiatry”

American Psychopathological Association, December 2022

RESEARCH GRANT PARTICIPATION

Principal Investigator

<u>Title</u>	<u>Agency</u>	<u>Level</u>	<u>Budget Amount</u>
Exploring Health and Wealth: Developing Novel Approaches to Understanding the Impact of Economic Precarity on Hospital Outcomes among Patients with Depression in the JHU System (1/1/22-12/31/22) Multi-PI, with Catherine Ettman and Peter Zandi	Hopkins Business of Health Initiative	NA	\$12,500
Design and analysis advances to improve generalizability of clinical trials for treating opioid use disorder (9/15/22 – 6/30/2027) R01DA056407 multi-PI; contact PI: Kara Rudolph (Columbia University)	NIDA	10%	\$770,972
Combining data sources to identify effect moderation for personalized mental health treatment (8/19/2021-5/31/2025) R01MH126856	NIMH	10%	\$1,730,235
Advanced computational approaches for integrating data to assess effect heterogeneity (11/1/2021-11/30/2025) ME-2020C3-21145	PCORI	10%	\$749,779
Data integration for causal inference In behavioral health (7/1/2020-6/30/2025) T32MH122357	NIMH	NA	\$1,217,290

RAPID: Evaluating the impact of COVID-19 on labor market, social, and mental health outcomes (2028683) co-PI's: Bennett (USC), de Bruin (USC), Krueter (Maryland), Stuart (BSPH), Thrul (BSPH)	NSF	1%	\$200,000
Causal mediation methods for Studying mechanisms in mental health R01MH115487	NIMH	20%	\$1,309,834
Training Program in Mental Health Services and Systems co-PI with Colleen Barry (2018-2020), Beth McGinty (2020-2022), Ramin Mojtabai (2023-) (7/1/2018-6/30/2020) T32MH109436	NIMH	NA	\$1,042,215
Using propensity scores for causal inference with covariate measurement error (7/2013-6/2017) R01MH099010	NIMH	35%	\$1,119,057
Estimating population treatment effects: Incorporating propensity scores with complex survey data (7/2015-6/2018) R305D150001 co-PI with Nianbo Dong	IES	15%	\$798,022
Statistical methods for using rigorous evaluation results to improve local education policy decisions (7/2015-6/2018) R305D150003 co-PI with Robert Olsen	IES	15%	\$896,361
Enhancing external validity in existing STEM evaluations (10/2013-9/2016) DRL-1335843 co-PI with Robert Olsen	NSF	12%	\$796,205
Estimating population effects of mental health interventions (8/2008-7/2013) HattonMH083846	NIMH	75%	\$727,092
Instrumental variables and propensity score methods when dealing with noncompliance (completed)	BSPH Faculty Innovations Fund	20%	\$29,557

Using administrative records to predict Census day residency (completed)	U.S. Census Bureau	10%	\$210,000
<i>Co-investigator</i>			
<u>Title</u>	<u>Grant Number</u>	<u>PI</u>	<u>Agency</u>
Evaluating and enhancing community Violence interruption effectiveness in the Nation's Capital City 4/3/23 – 12/31/26	NA	Webster & Richardson	Arnold Ventures
Implementation of the federal 988 suicide and mental health crisis hotline policy: determinants and effects of state policy implementation financing strategies 9/1/22 – 8/31/26	R01MH131649	Purtle	NIMH
Methods for generalizing inferences from cluster randomized trials to target populations 2/4/2022 – 12/31/2025 (BSPH site-PI)	R01LM013616	Dahabreh	NILM
Studying how state and local health services delivery policies can mitigate the effects of disasters on drug addiction treatment and overdose: A mixed methods study of COVID-19 8/1/2021-5/20/2025; \$1,727,672 (directs)	R01DA049789	McGinty	NIDA
State Medical Cannabis Laws, Chronic Pain, and Opioids: A Mixed-Methods Approach	R01DA049789	McGinty	NIDA
Using licensure authority to increase access to medications for opioid use disorder in specialty treatment	NA	Saloner	Arnold Ventures
Bloomberg Opioid Initiative (Evaluation core co-lead)	NA	Sharfstein	Bloomberg Philanthropies
ECHODAC: Environmental influences on child health outcomes data analysis center	U24ODO23382	Jacobsen	NIH (Director)
Center to accelerate translation of interventions to decrease premature mortality in SMI (Methods core co-Director)	P50MH115842	Daumit	NIMH
Center for Opioid Policy Research (site PI)	P50DA046351	Stein	NIDA

A national evaluation of Medicaid expansion on the prevention of child abuse and neglect, youth violence, and intimate partner violence	U01CE002947	Letourneau	CDC
Site selection when participation is voluntary: Improving the external validity of randomized trials	R305D190020	Olsen	IES
An evaluation of state laws intended to curb high-risk opioid prescribing	R01DA044987	Rutkow/ McGinty	NIDA
Consumer-directed health plans and substance use disorder treatment	R01DA044201	Barry	NIDA
Comorbid patterns with alcohol use disorders	R01AA016346	Crum	NIAAA
Testing the efficacy of a developmentally-informed coping power program in middle schools	R305A140070	Pas	IES
Impacts of payment reform on racial disparities in hospital psychiatric care	R01MD010255	Slade	NIMHD
Impacts of payment reform on the organization of hospital care for persons with mental illness	R01MH107459	Slade	NIMH
RAP club improving mental health and school performance in urban eighth graders	R305A160082	Mendelson	IES
A trauma informed intervention to improve mental health and school success for urban eighth graders	R01HD090022	Mendelson	NICHHD
Statistical methods to correct for measurement error in self-reported dietary data from lifestyle intervention trials (site PI)	R01HL127491	Siddique	NHLBI
Development & Malleability from childhood to adulthood	R01DA044184	Ialongo	NIDA
Evaluating Maryland state policies to improve school climate	R305H150027	Pas	IES
Making better use of randomized	ME-1502-27794	Dahabreh	PCORI

trials: Assessing applicability and
transporting causal effects

(Stuart: Site PI)

Generalizing RCT Efficacy Evidence: application to NIDA Clinical Trials Network	R01DA036520	Mojtabai	NIDA
Social Consequences of Mental Disorders: a Ten-Year Follow-up Study	R01MH096826	Mojtabai	NIMH
Impact of Increasing Adolescent depression Literacy on Treatment-Seeking behavior	R01MH095855	Wilcox	NIMH
Heterogeneity in Prevention Intervention Effects On Substance Use: A Latent Variable Causal Modeling Approach (PI on subcontract)	R01DA031698	Jo	NIDA
Identifying Predictors of Program Implementation to Inform A Tailored Teacher Coaching Process	R305A130060	Bradshaw	IES
Feasibility of Web-Based Coach Training to Support Classroom Prevention Programs	R21DA034206	Ialongo	NIDA
Center for Prevention and Early Intervention	P30MH086043	Ialongo	NIMH
Estimating mental health expenditures using national household survey data (PI on subcontract)	R21MH096285	Slade	NIMH
SMI Dual Eligibles and Medicare Part D: Impact on Medication Continuity and Outcomes	R01MH079974	Steinwachs	NIMH
Community violence & youth: Affect, behavior, academics (completed)	R01DA018318	Cooley	NIDA
Center for the Prevention of Youth Violence	U01CE001954	Leaf	CDC
Enhancing Safe Sleep Practices among Urban, Low-Income Mothers	R01HD072821	Gielen	NICHD
Substance use disorder treatment under new payment and delivery system models	R01DA035214	Huskamp, Barry	NIDA
Implementation of Federal Mental Health Parity	R01MH093414	Barry	NIMH

ACADEMIC SERVICE

Johns Hopkins Bloomberg School of Public Health

Member, Committee on Finance, 2022 -
 Chair, Health Policy and Management Chair Search Committee, 2021
 Co-Chair, Onsite Instruction Restart Committee, 2021
 Executive Vice Dean of Finance and Administration Search Committee, 2020
 Co-Chair, Health Policy Statistician Faculty search, 2019
 Health Behavior and Society Department Review and Chair Search Committee, 2018
 Department of Biostatistics Faculty Search Committee, 2017-2018
 Department of Epidemiology Faculty Search Committee, 2017
 Committee on Academic Standards, 2016-
 Hopkins Population Center Faculty Coordinating Committee, 2016-
 JHU Leadership Development Program (LDP), 2016
 Committee on Appointments and Promotions, 2015-2016
 Faculty Search Committee, Department of International Health, 2015-2016
 Biostatistics Learning Advisory Committee, 2008-
 Strategic Plan Steering Committee, 2007-2008
 Department of Mental Health seminar coordinator, 2007
 Biostatistics and Mental Health Causal Inference Working Group Coordinator, 2007-
 Department of Mental Health Admissions Committee, 2008-2013

Johns Hopkins University

AI-X Foundry Academic Program Committee, 2023-
 Race Neutral Alternatives Admissions Group, 2023-
 PhD Collective Bargaining Agreement negotiating team, 2023-
 Middle States Commission on Higher Education re-accreditation self-study working group, 2022 -
 Vivien Thomas Scholars Initiative Working Group and Admissions Committee, 2021 -
 JHU Student Services Excellence Initiative Governing Council, 2020 - 2021
 JHU Teaching Academy Advisory Council, 2019 -
 Biomedical Workforce Taskforce, 2018 - 2019
 Johns Hopkins University inHealth Methodology Working Group, 2013-2015
 PhD Innovation Initiative Review Committee, 2013

PRESENTATIONS*Invited talks at scientific meetings*

Using administrative records to predict Census day residency.

- Joint Statistical Meetings, Atlanta, GA, 2001.

Choosing well matched historical patients to supplement a randomized clinical trial.

- New England Statistics Symposium, Harvard University, Cambridge, MA, 2004.

Matching with multiple control groups and adjusting for differences between the groups.

- Joint Statistical Meetings, Minneapolis, MN, 2005.
- Mid-Atlantic causal inference workshop, Columbia University, New York, NY, 2005.

Estimating causal effects using school-level datasets.

- National Academy of Sciences Board on Testing and Assessment's Symposium on the Use of School-level Data, Washington, DC, 2005.

Dealing with control group dropout: Using historical patient information to supplement a randomized trial.

- Joint Statistical Meetings, Salt Lake City, UT, 2007.

Causal inference in education research.

- American Educational Research Association Dissertation Grants Conference, 2007.

Practical issues in implementing multiple imputation.

- Association for Public Policy Analysis and Management Annual Research Meeting, Washington, DC, 2007.

Discussion of “Is regression adjustment supported by the Neyman model for causal inference?” (P. Schochet).

- Association for Public Policy Analysis and Management Annual Research Meeting, Washington, DC, 2007.

Defining baseline using propensity score matching: Application to a clinical trial.

- International Conference of Health Policy Statistics, Philadelphia, PA, 2008.
- Sixth annual American Statistical Association Connecticut Chapter Mini-Conference on Applied Causal Inference, 2008.

Discussion of “Individual and contextual differences in treatment effects: New methodologies for experimental and observational research.” Invited Discussion.

- Society for Prevention Research Annual Meeting, San Francisco, CA, 2008.

New Directions in Prevention Science: Statistical Methodology. (Invited talk in session “Emerging investigators and emerging ideas in prevention science.”)

- Society for Prevention Research Annual Meeting, San Francisco, CA, 2008.

Assessing generalizability: Case study of PBIS.

- Statistical and Applied Mathematical Sciences Institute Summer 2008 Program on Meta-analysis: Synthesis and Appraisal of Multiple Sources of Empirical Evidence, Durham, NC, 2008.

Using propensity scores to select subjects for follow-up.

- Probability and Statistics Day, University of Maryland Baltimore County, 2009.

The use of propensity scores to assess generalizability.

- Atlantic Causal Modeling Conference, University of Pennsylvania, 2009.

Connections between *Experimental Designs* and non-experimental designs.

- Joint Statistical Meetings, Washington, DC, 2009.

Generalizing evidence from randomized clinical trials to target populations: The ACTG-320 trial.

- Joint Statistical Meetings, Vancouver, BC, Canada, 2010.

Estimating Causal Effects. (Invited discussant)

- American Political Science Association Annual Meeting, Washington, DC, 2010.

From propensity scores to prognosis scores: Matching methods in the context of principal stratification.

- Causal Inference in Health Research meeting, Centre de Recherche Mathematiques, Montreal, QC, Canada, 2011.

Challenging issues in the analysis of large-scale observational data: What you need to know.

- American Educational Research Association Grantee Meeting, Washington, DC, 2011.

Recent advances in estimating causal effects using prospective electronic clinical data.

- EDM Forum Methods Symposium, Washington, DC, 2011.

Statistical approaches to studying mediator effects in education research. (Invited discussant)

- Society for Research on Educational Effectiveness Spring 2012 Conference, Washington, DC, 2012.

Estimates of external validity bias when impact evaluations select sites purposively.

- Society for Research on Educational Effectiveness Spring 2012 Conference, Washington, DC, 2012.

Getting ready for propensity score methods: Designing non-experimental studies and selecting comparison groups.

- Office of Planning, Research, and Evaluation, Administrative for Children & Families, U.S. Department of Health and Human Service, Washington, DC, 2012.

Advances and challenges in propensity score matching. (Invited discussant)

- Society for Research on Educational Effectiveness Spring 2013 Conference, Washington, DC, 2013.

Strategies for dealing with covariate measurement error in propensity scores.

- Society for Research on Educational Effectiveness Spring 2013 Conference, Washington, DC, 2013.
- Joint Statistical Meetings, Boston, MA, 2014

Statistical methods for assessing and enhancing external validity of randomized experiments.

- AcademyHealth Annual Research Meeting, Baltimore, MD, 2013.
- Association for Psychological Science Annual Meeting, Washington, DC, 2013.
- Health Services Research Network, The Health Foundation, London, UK, 2014

Methods for assessing sensitivity to unobserved confounding in non-experimental studies.

- AcademyHealth Annual Research Meeting, Baltimore, MD, 2013.

Identifying Elements of Your Intervention that Generate Positive Impacts: Methodological Progress for Experimental Research. (Invited discussant)

- Office of Planning, Research, and Evaluation, Administrative for Children & Families, U.S. Department of Health and Human Service, Welfare Research and Evaluation Conference, Washington, DC, 2013.

Innovations in Propensity Score Methods for Addressing New Causal Questions in Observational Studies. (Invited discussant)

- Joint Statistical Meetings, Montreal, Canada, 2013.

Model Selection and Uncertainty in Causal Effect Estimation. (Invited discussant)

- Joint Statistical Meetings, Montreal, Canada, 2013.

Using propensity scores and difference-in-differences methods to estimate the effects of mental health parity.

- International Conference on Health Policy Statistics, Chicago, IL, 2013.

Statistical methods for data synthesis. (Invited discussant)

- International Conference on Health Policy Statistics, Chicago, IL, 2013.

Assessing external validity: A discussion of setting standards. (Roundtable leader)

- American Evaluation Association Annual Meeting, Washington, DC, 2013.

Reweight methods for generalizing results from RCTs.

Propensity score methods for estimating causal effects

- National Academy of Sciences Meeting on Observational Studies, for the National Institute of Aging, 2014.
- Society for Epidemiologic Research Annual Meeting, Seattle, WA, 2014.

Assessing methods for generalizing experimental impact estimates to target samples

- Atlantic Causal Inference Conference, Brown University, 2014

Bayesian approaches for handling differential covariate measurement error in propensity score methods

- International Biometrics Conference, Florence, Italy, 2014

Statistical Challenges in Education Research (Invited Discussant)

- Joint Statistical Meetings, Boston, MA, 2014

Using big data to estimate population treatment effects

- Workshop on big data in health policy, The Fields Institute, Toronto, Canada, 2015

“Implications of and solutions for covariate measurement error and differential covariate measurement across treatment groups.”

- FDA/University of Maryland M-CERSI workshop on “Methodological Considerations to address Unmeasured Health Factors in Pharmacoepidemiology Studies that Rely on Electronic Healthcare Databases to Evaluate the Safety of Regulated Pharmaceutical Products in the Post-approval Setting.” Silver Spring, MD, May 2015.
- International Meeting of the Psychometric Society, Beijing, China, July 2015
- University of Illinois at Chicago Department of Psychiatry Division of Biostatistics and Epidemiology. Chicago, IL, January 2016.

Statistical methods for implementation science

- Center for AIDS research conference on social and behavioral sciences, Baltimore, MD, October 2015

Estimating population treatment effects for public health interventions

- Dean’s Lecture, BSPH, Baltimore, MD, February 2016
- Ross-Royall Symposium on population inference, BSPH, Baltimore, MD, February 2016

Invited discussion on big data

- Refining the concept of scientific inference when working with big data. A workshop of the Committee on Applied and Theoretical Statistics, The National Academies of Sciences, Engineering, Medicine. Washington, DC, June 2016

Methods for assessing and enhancing the external validity of randomized trials

- Keynote lecture, ActStat annual meeting, Chicago, IL, July 2016.
- Keynote lecture, United Kingdom Causal Inference Meeting (UK CIM), University of Essex, April 2017.
- Stockholm Conference on Behavioral and Social Intervention Research: Premises, Challenges, and Revisiting Positions. Stockholm, Sweden, May 2017.
- World Psychiatric Association Epidemiology and Public Health section. New York, NY, May 2018.

Machine learning methods for causal inference in non-experimental studies

- Joint Statistical Meetings, Baltimore, MD, August 2017.

Discussion, Statistical methods for suicide research

- Joint Statistical Meetings, Baltimore, MD, August 2017.

Discussion, Collecting comprehensive and representative input

- US Food and Drug Administration Stakeholder Meeting, December 2017.

Invited moderator, Session on use of historical patient data in single arm trials

- Friends of Cancer Research Annual Meeting, Washington, DC, October 2018.

Consequences of effect heterogeneity when predicting site-level impacts

- US Department of Education PI's meeting, Washington, DC, January 2019.

Confounding? Assumptions? Huh? Mediation analysis in the psychology and psychiatry literature.

- University of Florida Department of Statistics meeting on Causality and Mediation, Gainesville, FL, January 2019.

Propensity score methods for estimating policy effects

- Society for Epidemiologic Research webinar (> 150 attendees); March 2019

Opportunities for, and complexities of, using real world data

- NISS/Merck Webinar meet-up (> 320 attendees); April 2019

Data and methods for estimating the effects of state opioid policies

- National Academies of Science Engineering and Medicine; Committee on Applied and Theoretical Statistics; June 2019

Discussion: Evaluating strategies to reduce gun violence

- National Institute of Statistical Sciences Ingram Olkin Statistics Serving Society (S3) Forum; June 2019

Keynote Speaker, Assessing and enhancing the external validity of randomized trials

- Australasia Epidemiologic Association Annual Meeting, Brisbane, Australia; October 2019

The landscape for evaluation of programs and policies to reduce the consequences of the opioid epidemic

- International Conference on Health Policy Statistics, San Diego, January 2020

Invited discussant, "Leveraging existing data on the opioid epidemic to quantify risk and inform policy"

- International Conference on Health Policy Statistics, San Diego, January 2020

Statistical questions, and challenges, for estimating the effects of opioid-related policies and programs

- International Conference on Health Policy Statistics, San Diego, January 2020

The use of synthetic control and other covariate adjustment strategies for policy evaluation

- International Conference on Health Policy Statistics, San Diego, January 2020

Accounting for differences in population: Predicting intervention impact at scale

- Society for Prevention Research, virtual conference, June 2021

The future of methods and measures in education research

- National Academies of Sciences, Engineering, and Medicine meeting on The Future of Education Research and the Institute of Education Sciences in the US Department of Education, virtual meeting, July 2021

Combining experimental and non-experimental data to examine treatment effect heterogeneity

- American Psychopathological Association, New York City, March 2023

Other talks and posters at scientific meetings presented by E.A. Stuart

Matching using two control groups.

- Joint Statistical Meetings, San Francisco, CA, 2003.

Individual-level multiple systems estimation: Predicting Census day residency.

- Joint Statistical Meetings, Toronto, Ontario, 2004.

Estimating causal effects using multiple control groups.

- Conference for the Society for Multivariate Analysis in the Behavioral Sciences (SMABS), Jena, Germany, 2004.

Using historical patients to supplement a randomized trial.

- Biennial CDC and ATSDR Symposium on Statistical Methods, Washington, DC, 2005.

Estimation of state-level standardized food stamp participation rates.

- Joint Statistical Meetings, Seattle, WA, 2006.

Design and implementation of case-control matching to estimate the effects of value-added assessment.

- American Educational Research Association Meeting, San Francisco, CA, 2006.

Making use of limited resources: Optimal selection of subjects for follow-up.

- Society for Prevention Research Annual Meeting, Washington, DC, 2007.
- Prevention Science Methodology Group conference. Baltimore, MD, 2008.
- Society for Prevention Research Annual Meeting, Washington, DC, 2009.

Using Full Matching to Estimate Causal Effects in Non-Experimental Studies: Examining the Relationship between Adolescent Marijuana Use and Adult Outcomes.

- Society for Epidemiologic Research, Boston, MA, 2007.
- Society for Prevention Research Annual Meeting, San Francisco, CA, 2008.

Handling missing data: The motivation and method of multiple imputation.

- 21st Annual Research Conference: A System of Care for Children's Mental Health: Expanding the Research Base. Tampa, FL, 2008.

Assessing generalizability: Case study of PBIS.

- Society for Prevention Research Annual Meeting, Washington, DC, 2007.
- 2nd Annual NIH conference on the science of dissemination and implementation: Building research capacity to bridge the gap from science to service. Bethesda, MD, 2009.
- American Public Health Association Annual Meeting, Philadelphia, PA, 2009.
- Society for Prevention Research Annual Meeting, Washington, DC, 2011.

Combining experimental and population data: Moving towards external validity.

- Banff International Research Station Workshop on Causal Inference, Banff, Canada, 2009.

Estimating mediation using propensity score matching.

- Society for Prevention Research Annual Meeting, Washington, DC, 2009.

Balance metrics for propensity score methods.

- Joint Statistical Meetings, Miami Beach, FL, 2011.

Using multiple imputation – external calibration for propensity score estimation in the presence of covariate measurement error

- Society for Research in Educational Effectiveness Annual Meeting, March 2013
- National Council on Measurement in Education Annual Meeting, April 2014
- Society for Prevention Research Annual Meeting, May 2015

Bayesian approaches for handling differential covariate measurement error in propensity score methods

- International Biometrics Society Conference, Florence, Italy, July 2014

Invited Discussant, Session on Integrative Data Analysis

- Gerontological Society of America, Washington, DC, November 2014

Keynote speaker, Causal inference

- University of Umea Winter Conference in Statistics, Borgafjall, Sweden, March 2015

Combining Propensity Score Methods and Complex Survey Data to Estimate Population Treatment Effects.

- Society for Research on Educational Effectiveness Annual Meeting, Washington, DC, March 2016

Invited Discussant, Recent advances in matching methods for non-experimental studies

- Joint Statistical Meetings, Chicago, IL, July 2016

Recent advances in non-experimental comparison group designs

- Building Strong Evidence in Challenging Contexts: Alternatives to traditional randomized controlled trials. Office of Planning Research and Evaluation, Administration for Children & Families, U.S. Department of Health and Human Services, September 2016

Keynote speaker, Moving towards external validity: Methods for assessing the generalizability of randomized trial results to target populations

- ActStat Annual Meeting, Chicago, IL, August 2016

Using historical patient data to estimate population treatment effects

- ENAR Spring Meeting, International Biometric Society, Washington, DC, March 2017

Mediation analyses to examine behavioral interventions

- Association for Behavioral and Cognitive Therapies, online, November 2020

Using stacked comparative interrupted time series methods for opioid policy evaluation

- ENAR Spring Meeting, International Biometric Society, virtual, March 2021
- Invited discussant, fusion designs for epidemiologic research
- Society for Epidemiologic Research annual meeting, Chicago, IL, June 2022

The role of epidemiology in expert consensus panels

- Society for Epidemiologic Research annual meeting, Chicago, IL, June 2022

Invited discussant, fusion designs for epidemiologic research

- Society for Epidemiologic Research annual meeting, Chicago, IL, June 2022

Scientific communication for epidemiologists during the COVID-19 pandemic

- Society for Epidemiologic Research annual meeting, Chicago, IL, June 2022

Discussant, Statistical methods for studying disparities

- Joint Statistical Meetings, Washington, DC, August 2022

Discussant, Making meta-analysis easy

- Society for Research on Educational Effectiveness annual meeting, Alexandria, VA, September 2022

Invited Discussant, Plenary (Dr. Sherry Glied)

- International Conference on Health Policy Statistics, Scottsdale, AZ, January 2023

Invited Colloquia

Matching methods for estimating causal effects using multiple control groups.

- Williams College Department of Mathematics and Statistics, Williamstown, MA, 2003.
- Colby College Department of Mathematics and Statistics, Waterville, ME, 2003.
- Georgetown University Department of Biostatistics, Washington, DC, 2003.

- Boston University Veteran's Administration, Bedford, MA, 2004.
- Harvard University Department of Government, Cambridge, MA, 2004
- University of Washington Department of Biostatistics, Seattle, WA, 2004.
- University of Pennsylvania Department of Statistics, Philadelphia, PA, 2004.
- The RAND Corporation, Santa Monica, CA, 2004.
- Mathematica Policy Research, Inc., Washington, DC, 2004.
- Harvard University Department of Biostatistics, Boston, MA, 2004.

Evaluation of a school dropout prevention program: Estimation of causal effects through matching.

- Smith College Department of Mathematics, Northampton, MA, 2005.

Propensity score matching methods for estimating the effect of a school-level intervention.

- Johns Hopkins University Department of Mental Health, Washington, DC, 2006.

Causal Inference in Political Science and Public Policy Research: Matching as Nonparametric Preprocessing for Improving Parametric Causal Inference.

- George Washington University Institute of Public Policy, Washington, DC, 2006.

Propensity score matching with multiple control groups.

- Johns Hopkins University Department of Economics and Department of Biostatistics Causal Inference Workshop, Baltimore, MD, 2006.
- Prevention Science & Methodology Group, 2007.

Defining "baseline" in a propensity score matching analysis: Application to a clinical trial.

- The RAND Corporation, Washington, DC, 2006.

Statistical methods: Focus on experiments and their complications.

- CHIPS Summer Training Institute, Baltimore, MD, 2007.

Propensity scores and matching methods in education research: Designing observational studies.

- U.S. Department of Education, Washington, DC, 2007.

What happens when some of the controls get the treatment? Connections to propensity scores, modeling, and clinical trial simulation.

- U.S. Food and Drug Administration, Rockville, MD, 2007.

Making use of limited resources: Optimal selection of subjects for follow-up.

- Prevention Science & Methodology Group, 2007.
- Prevention Science & Methodology Group biannual conference, Baltimore, MD, 2008.

Propensity score matching methods for examining the relationship between adolescent drug use and adult outcomes.

- The University of Chicago, Department of Health Studies, Chicago, IL, 2007.
- The Methodology Center, The Pennsylvania State University, State College, PA, 2007.
- Initiative in Population Research, Ohio State University, Columbus, OH, 2008.

Principal stratification in experimental and non-experimental studies.

- American Institutes for Research, Washington, DC, 2008.

The use of propensity scores in mental health research.

- Department of Mental Health, BSPH, 2009.

Practical issues in the use of propensity score methods.

- Stat-Epi Group, BSPH, 2009.
- Department of Mathematics and Statistics, University of Maryland Baltimore County, 2009.

The use of propensity scores to assess generalizability.

- BEAR Program, Graduate School of Education, University of California at Berkeley, Berkeley, CA, 2008.
- Biostatistics Division, Department of Psychiatry, Columbia University, 2009.
- Department of Measurement, Statistics, and Evaluation, University of Maryland College of Education, 2010.
- Department of Biostatistics, UCLA, 2010.
- Department of Biostatistics and Epidemiology, McGill University, 2010.
- Prevention Science Methodology Group, 2010.
- Division of Biostatistics, University of Maryland Marlene and Stewart Greenebaum Cancer Center, Department of Epidemiology and Public Health, 2010.
- Institute of Statistics, Ludwig-Maximilians-University, Munich, Germany, 2011.
- Institute of Psychiatry, University of Jena, Germany, 2011.
- Institut für Arbeitsmarkt-und Berufsforschung, Nuremberg, Germany, 2011.

Recent advances in propensity score methods: Estimation and balance checking.

- Welch Center for Prevention, Epidemiology, and Clinical Research, Johns Hopkins Medical Institutions, April 2012.

What propensity scores can and can't do for you

- Prevention Science Methodology Group, 2012.

Assessing the generalizability of randomized trial results in education and public policy.

- National Opinion Research Center (NORC), Bethesda, MD, 2012.
- The Urban Institute, Washington, DC, 2012.
- Northwestern University Institute for Policy Research, Evanston, IL, 2012.
- Harvard University Graduate School of Education, Dean's Distinguished Lecture, Cambridge, MA, 2012.
- Social Experiments in Practice: The why, when, where, and how of experimental design & analysis, Abt Associates 50th Anniversary, Washington, DC, 2014.
<http://www.appam.org/social-experiments-in-practice-the-why-when-where-and-how-of-experimental-design-analysis/>

Recent advances in propensity score methods: Balance checking and sensitivity analysis

- Abt Associates, Bethesda, MD, 2012
- University of Maryland, Department of Measurement, Statistics, and Evaluation, College Park, MD, 2014

Propensity score methods II: The how (of matching), how well (diagnostics), and what if (complications)?

- Pennsylvania State University IES Training Program Summer Institute, State College, PA, 2013.

Leveraging 'big data' to estimate population treatment effects.

- Curry School of Education, University of Virginia, Dean's Lecture, Charlottesville, VA, 2013.

Propensity score methods for when covariates are measured with error

- Georgetown University Department of Biostatistics, Washington, DC, 2014
- The RAND Corporation, Jointly sponsored by the Statistics group and the Center for Causal Inference, Alexandria, VA, 2014
- DCEG Biostatistics Branch, National Cancer Institute, the National Institutes of Health, 2015

Applying propensity score methods in psychiatry and psychology: Case study of suicide prevention using Danish registry data

- Johns Hopkins Medicine Department of Psychiatry Research Conference, 2014

Panel on patient centered outcomes research

- Johns Hopkins Bloomberg School of Public Health, 2014

The effects of federal parity legislation on mental health service use among children with Autism Spectrum Disorders

- Center for Health Services and Outcomes Research and Wendy Klag Center for Autism and Developmental Disabilities, Johns Hopkins Bloomberg School of Public Health, 2015

PCORI and the Clinical Trials Advisory Panel: Perspectives from Year 1

- Prevention Science Methodology Group, 2015
- Center for Clinical Trials, Johns Hopkins University, 2015

The use of big data to assess and enhance external validity

- McCourt School of Public Policy, Initiative in Big Data, Georgetown University, 2015
- Interdisciplinary Seminar in Quantitative Methods, University of Michigan, 2015
- Department of Biostatistics, Institute of Psychiatry, King's College London, 2015
- Penn State University, Prevention Research Center and Methodology Center joint seminar series, 2016
- University of North Carolina at Chapel Hill, Causal Inference Working Group, December 2016
- Department of Statistics, University of Pennsylvania Wharton School of Business, December 2016

Using propensity scores with complex survey data

- National Center for Health Statistics, Hyattsville, MD, 2015
- Westat, Rockville, MD, 2015

Confronting unobserved confounding by using sensitivity analyses in non-experimental studies in education and health policy

- Mathematica Policy Research, Inc., Washington, DC, 2015

Using administrative data to estimate causal effects

- The Health Foundation, London, England, 2015

Using synthetic control groups to estimate the effects of policy changes

- Mathematica Policy Research, Inc., Washington, DC, 2015

Why should we care about who enrolls in a randomized trial? Assessing and enhancing the generalizability of trials to target populations

- Johns Hopkins Medicine Department of Psychiatry Research Conference, October, 2016

Assessing and enhancing the generalizability of randomized trials to target populations

- Dartmouth College, Hanover, NH, October 2016
- Harvard University Institute for Quantitative Social Science, Cambridge, MA, March 2017
- Melbourne School of Population and Global Health, Melbourne, Australia, November 2017

External validity and the generalizability of randomized trial results to target populations

- Dartmouth College, Hanover, NH, October 2016
- University of Michigan Department of Biostatistics, Ann Arbor, MI, April 2018
- Harvard University Department of Biostatistics, Boston, MA, September 2018
- Vanderbilt University Department of Biostatistics, Nashville, TN, October 2018
- Facebook, San Jose, CA, April 2019
- Columbia University Department of Biostatistics, New York, NY, May 2019
- American University Department of Mathematics and Statistics, Washington, DC, October 2019
- Yale University Department of Biostatistics, virtual, September 2020
- University of Wisconsin Department of Biostatistics, virtual, October 2020
- Mental Health Research Network Methods Special Interest Group, virtual, October 2020
- University of California – San Diego School of Public Health Grand Rounds, virtual, May 2021
- Indiana University School of Public Health, virtual, April 2022

Propensity score methods in the context of covariate measurement error

- School of Public Health & Preventive Medicine, Monash University, Melbourne, Australia, November 2017

Moderator, Conventions for handling incomplete/missing data

- Mini-symposium series in HIV methods @ JHU, Baltimore, MD, November 2017

Introduction to propensity score methods

- National Cancer Institute, April 2018
- American Association for Public Opinion Research, webinar, virtual, April 2022

The opportunities, and challenges, in policy evaluation during the COVID-19 pandemic

- Brown University Data Science Institute Decoding Pandemic Data seminar, virtual, October 2020
- London School of Economics Department of Statistics, virtual, February 2021

Measuring population-level mental health during the COVID-19 pandemic

- Oxford University Center for Evidence-Based Intervention, Department of Social Policy and Intervention, Effects of COVID-19 on social and behavioral outcomes seminar series, virtual, October 2020

The role of data science in policy evaluation during the COVID-19 pandemic

- International Program in Survey and Data Science, CONNECT Annual Meeting, virtual, June 2021
- Harvard Data Science Initiative, virtual, October 2021
- University of North Carolina, Chapel Hill, Causal Inference Working Group, virtual, March 2022
- University of Washington Center for Statistics and the Social Sciences, Seattle, WA, March 2022

Policy evaluation in the real world

- International Conference on Health Policy Statistics, Scottsdale, AZ, January 2023

Challenges to statistical approaches for health equity

- Data Science for Health Equity, Genomics England, and the Alan Turing Institute, virtual, January 2023

The best (and worst?) of both worlds: Combining randomized trial and electronic health record data to examine treatment effect heterogeneity

- Harvard/Karolinska CAUSALab, virtual, April 2023
- Department of Statistics, University College London, virtual, May 2023
- Division of Quantitative Sciences, Kimmel Cancer Center, Johns Hopkins University, February 2023
- Harvard Data Science Institute Causal Inference Group, April 2024
- National Academy of Sciences, Engineering, and Medicine Federal Statistics AI Day, May 2024

Causal designs for studying policy and system changes

- National Academy of Sciences Engineering and Medicine, Board on Health Care Services, April 2024

ADDITIONAL INFORMATION

Personal statement of research and research objectives

Trained as a statistician, my primary research interests are in the development and use of methodology to better design and analyze the causal effects of public health and educational interventions. In this way I hope to bridge statistical advances and research practice, working with mental health and educational researchers to identify and solve methodological challenges.

I am particularly interested in the trade-offs in different designs for estimating causal effects, especially in terms of improving internal validity of non-experimental studies and external validity

of randomized studies. This translates into two primary research areas. First, one of my primary research areas is in the use of propensity score methods for estimating causal effects in non-experimental studies (essentially as a tool to improve internal validity and reduce confounding). My interests in this area include providing advice for researchers in terms of best practice for estimation, diagnostics, and use of propensity score methods. This also includes investigation of how to handle complexities in propensity score methods, including multilevel data settings, covariate measurement error, and complex survey data. My second primary research area is in methods to assess and enhance the external validity (generalizability) of randomized trial results and enable policymakers to determine how applicable the results of a particular randomized study are to their own target population. I also have interests in policy evaluation using large-scale data sources.

Keywords

Bayesian modeling, biostatistics, causal inference, external validity, generalizability, multi-level modeling, observational study, prevention research, propensity scores

Exhibit B

Materials Considered List

1. O'Brien, K. M., Wentzensen, N., Ogunsina, K., Weinberg, C. R., D'Aloisio, A. A., Edwards, J. K., & Sandler, D. P. (2024). Intimate care products and incidence of hormone-related cancers: A quantitative bias analysis. *Journal of Clinical Oncology*, JCO-23.
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